

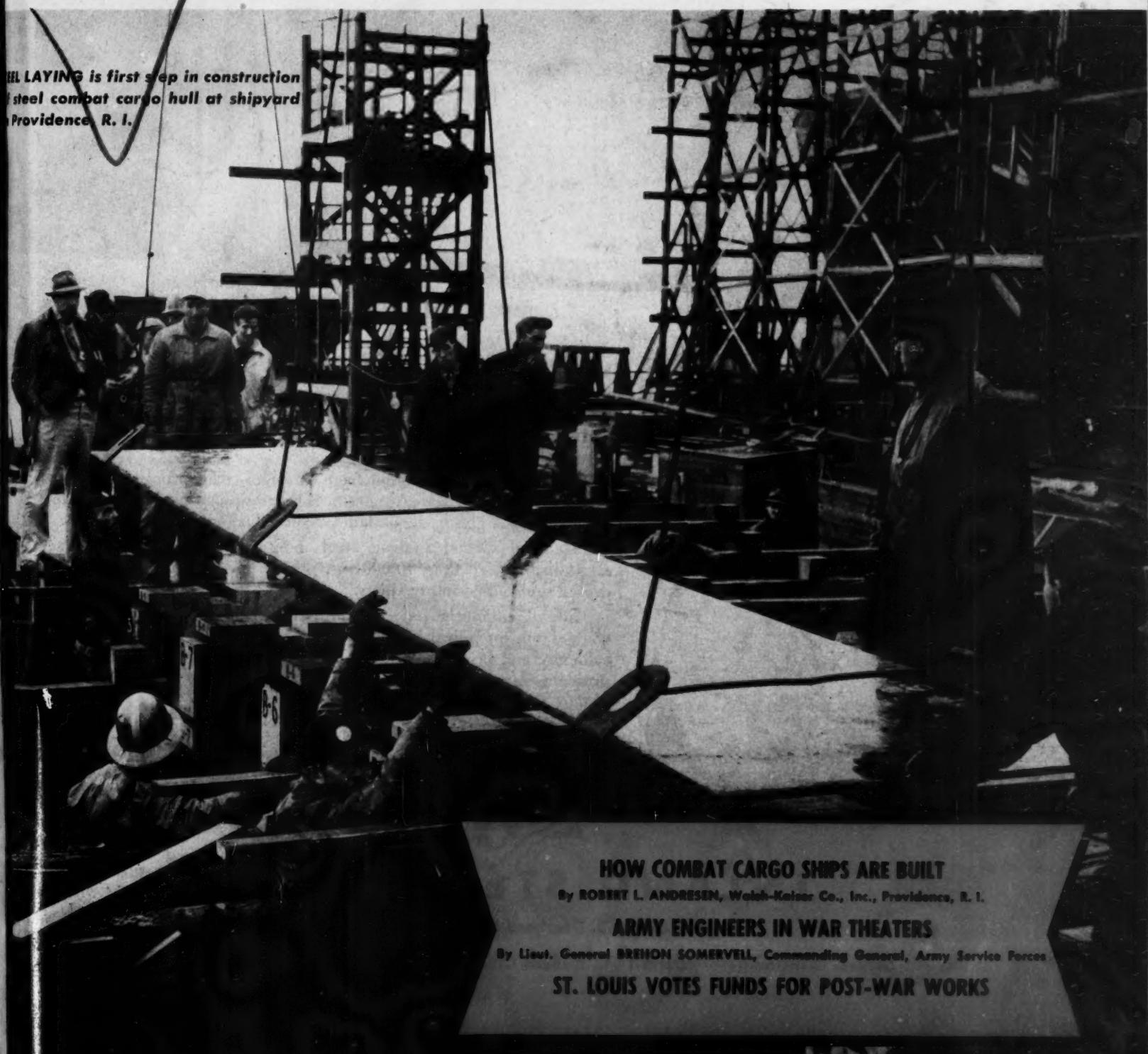
A PICTORIAL SURVEY OF CURRENT PRACTICE, EQUIPMENT AND MATERIALS

Construction Methods

FEBRUARY
1945

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STEEL LAYING is first step in construction of steel combat cargo hull at shipyard, Providence, R. I.

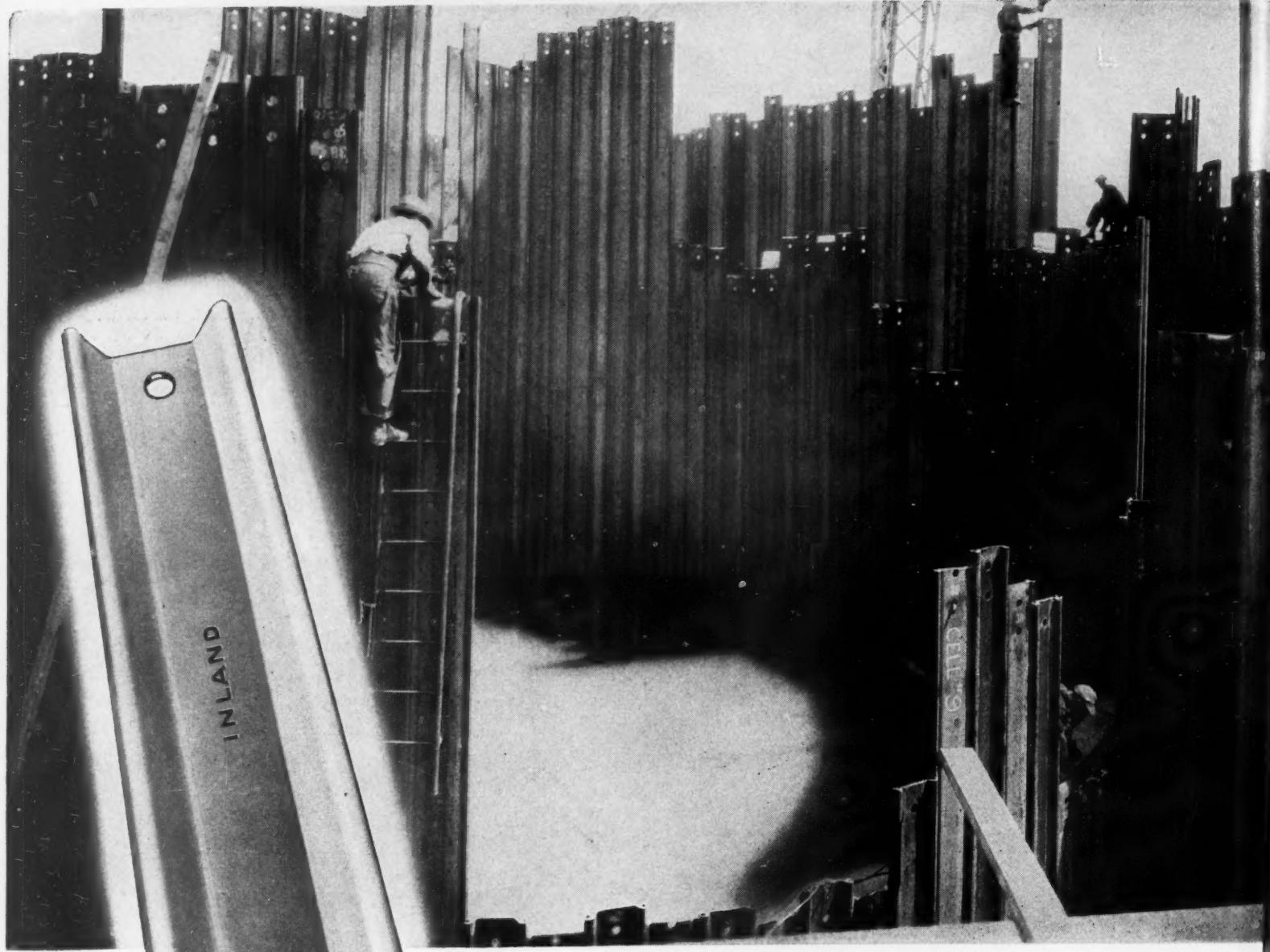
HOW COMBAT CARGO SHIPS ARE BUILT

By ROBERT L. ANDRESEN, Walsh-Kaiser Co., Inc., Providence, R. I.

ARMY ENGINEERS IN WAR THEATERS

By Lieut. General BREHON SOMERVILLE, Commanding General, Army Service Forces

ST. LOUIS VOTES FUNDS FOR POST-WAR WORKS



Inland Steel Piling — Dependable, Economical

In all parts of the country, from coast-to-coast—for locks, dams, docks, breakwaters, and numerous other applications—Inland Steel Sheet Piling is giving dependable, economical service.

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Inland engineers have had broad experience in working with contractors on piling jobs. They are ready to help you design for economy and fast erection, no matter how difficult the construction problems may be.

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CURRENT JOBS

... and Who's Doing Them

BUILDINGS

Public—Hospital in Washington, D. C., will be built by **Charles H. Tompkins Co.**, of Washington, for an estimated \$3,000,000. Another Washington hospital will be built by **John McShain, Inc.**, of Philadelphia, Pa., for \$2,000,000. Contract for \$1,750,000 apartment house in Washington was awarded to **Wark & Co.**, of Philadelphia, Pa. Navy contract for buildings at Cherry Point, N. C., went to **T. A. Loving & Co.**, of Goldsboro, for \$1,448,576. **R. E. Campbell**, of Los Angeles, Calif., has \$1,357,400 Navy contract for hospital addition at Long Beach. **Shumaker & Evans**, of Los Angeles, will build 450 war dwelling units at Oceanside, Calif., for \$1,118,612. **Del Balso Construction Corp.**, of New York, N. Y., has \$1,086,628 Army contract for storage facilities near Jersey City, Newark and Linden, N. J. **De Luca & Son, Inc.**, of San Francisco, Calif., will build 435-unit family dwellings for \$1,079,000. Navy contract for hospital additions at Philadelphia, Pa., was awarded to **Hughes-Foulkrod Co.**, of Philadelphia, for \$993,500. Contract for 352 family dwelling units at San Diego, Calif., went to **Wm. C. Crowell Co.**, of Pasadena, for \$940,933.

Industrial—Contracts for Houston, Tex., gasoline plant were awarded to **Foster Wheeler Corp.**, of Houston; **C. F. Braun & Co.**, of Alhambra, Calif., and **Fluor Corp.**, of Los Angeles, for \$11,285,000.

Commercial—Contract for enlarging Army ordnance plant at Karnack, Tex., went to **Essliger-Misch Co.**, of Detroit, Mich., for an estimated \$8,500,000.

HEAVY CONSTRUCTION

Low bidder on tunnel at Baltimore, Md., was **S. A. Healy Co.**, of Chicago, Ill., for \$7,635,000. Storm water sewer outlet at Idlewild, N. Y., municipal airport will be built by **A. Catapano**, of Laurelton, for \$1,140,824 (Sect. 2), and **Nicholas Di Menna Co.**, of New York, for \$882,000 (Sect. 1).

HIGHWAYS

Among recent highway contract awards are the following: Florida: \$339,008 and \$151,194 to **R. H. Wright & Son**, of Ft. Lauderdale; and \$390,658 to **Duval Engineering & Contracting Co.**, of Jacksonville. Georgia: \$462,807 to **Scott Construction Co.**, of Thomasville; and \$289,807 to **H. G. Smith**, of Fitzgerald. Indiana: \$314,598 to **Riehl-Riley Construction Co.**, of Goshen; \$288,616 to **Mid-American Engineering Corp.**, of Skokie, Ill.; \$257,919 to **Indiana Asphalt Paving Co.**, of Indianapolis; \$237,723 to **Bontrager Construction Co.**, of Elkhart; \$236,134 to **W. D. Vogel**, of Indianapolis; \$233,841 to **R. Rogers**, of Bloomington; and \$217,627 to **Payne & Dolan**, of Milwaukee, Wis. Ohio: \$318,364 and \$122,565 to **A. J. Baltes, Inc.**, of Norwalk. Oklahoma: \$544,722 to **J. A. Raines**, of Muskogee; \$321,379 to **Stowell & Pharoah**, of Henryetta; and \$251,082 to **S. E. Evans Construction Co.**, of Fort Smith, Ark. Pennsylvania: \$2,500,000 to **McCrady Construction Co.**, of Pittsburgh. Texas: \$488,072 to **T. M. Brown & Son**, of Baird; \$277,015 to **J. F. Buckner**, of Cleburne; \$236,131 to **Austin Road Co.**, of Dallas; and \$204,408 to **R. P. Farnsworth & Co., Inc.**, of Houston. Washington: \$439,571 to **Leonard & Slatte**, of Portland, Ore.

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Construction Methods

A Pictorial Survey of Current Practice, Equipment and Materials

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THE HOW OF IT

For the benefit of readers concerned with the practical application of method or equipment the following references are to articles or illustrations in this issue that tell:

How **COMBAT CARGO SHIPS** were built in 40 major all-welded steel sections by pre-assembly methods involving repetitive operations —p. 60
How **PROPELLER SHAFT STRUT** for ship, which arrived at yard in three pieces, was Thermite welded —p. 62
How **MECHANICAL WORK** and installation of piping, electrical and ventilation systems was completed at outfitting pier —p. 65
How **ARMY ENGINEERS** were trained at structural steel workers school —p. 66
How **PIPELINES, ROADS AND AIRFIELDS** were built by Army Engineers on all fighting fronts —p. 68
How **BOMBER BASE** was constructed on Saipan by Aviation Engineers —p. 72
How **HUGE TIRE** was recapped for use on earth-moving equipment —p. 73
How **HARD FACING** of wearing parts prolonged useful life of screw conveyor in rock products plant —p. 74
How **CARBIDE-TIPPED MASONRY DRILLS** were used to bore holes through concrete ribs of state capitol dome —p. 75
How **BARRICADED SIDINGS** with concrete walls were built to minimize danger in transshipment of explosives —p. 76
How **ALL-MAHOGANY PILEDRIVER** was built for Seabees in Pacific war theater —p. 79
How **WARTIME HIGHWAY MAINTENANCE** keeps essential traffic moving —p. 80
How **TRAFFIC-LINE MARKER** was used to spray paint on metal guard rail —p. 82
How **CENTERLINE STRIPE** was applied to pavement and covered with stone chips —p. 83
How **ST. LOUIS** programmed and voted funds for post-war construction —p. 84
How **RAILROAD OVERPASS** was replaced with aid of arc welding —p. 87

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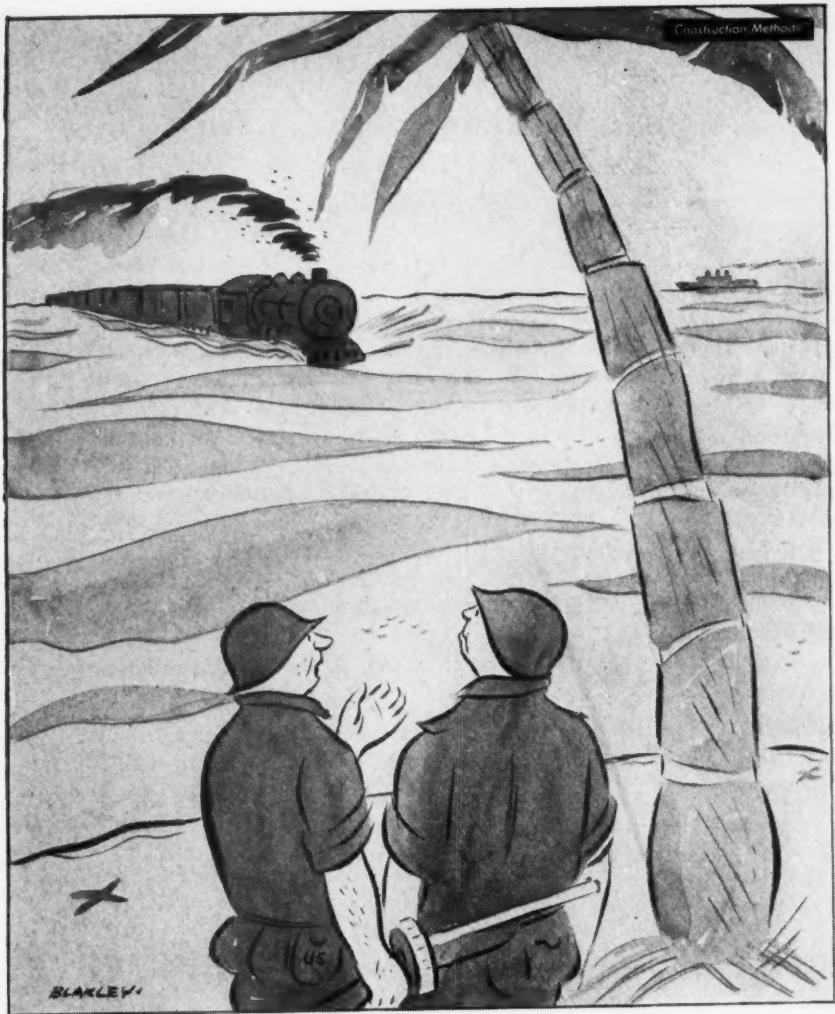
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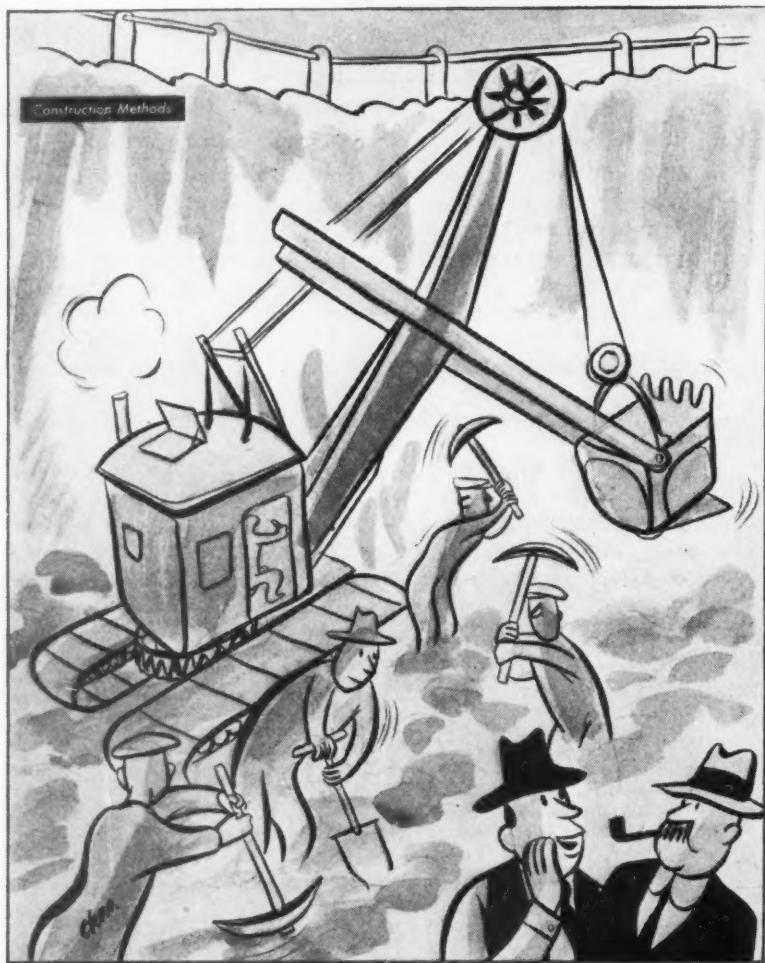
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New Company Connection

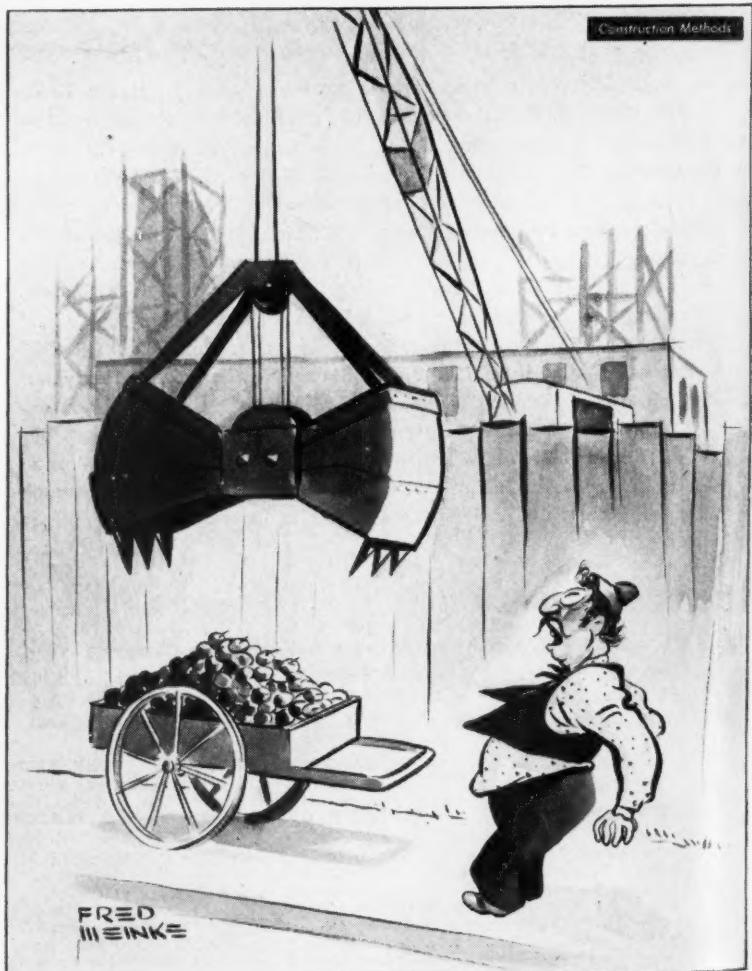
New Title or Position



"Sure it's Seabees! Who else could it be?"



"I was getting behind in my work until I dropped a few hints about buried treasure."



PLAN POST-WAR HIGHWAYS FOR TWO-WAY ECONOMY



FORESIGHT argues for speed in readying highways for contract as soon as the shooting stops. Experience argues for selective use of these two high-quality Portland cements: 'Incor'* 24-Hour Cement at critical points where dependable high early strength saves time and money and opens bridges and highways weeks sooner . . . elsewhere, use Lone Star Cement. That's selective concreting and it means two-way economy: Initially, through faster completion, usually at less cost. Over the years, through utmost durability and lowest maintenance, proved by outstanding performance under nation's heaviest traffic.

*Reg. U. S. Pat. Off.

LONE STAR CEMENT CORPORATION

Offices: ALBANY • BIRMINGHAM • BOSTON • CHICAGO • DALLAS • HOUSTON • INDIANAPOLIS • JACKSON, MISS.
KANSAS CITY, MO. • NEW ORLEANS • NEW YORK • NORFOLK • PHILADELPHIA • ST. LOUIS • WASHINGTON, D. C.
LONE STAR CEMENT, WITH ITS SUBSIDIARIES, IS ONE OF THE WORLD'S LARGEST CEMENT PRODUCERS: 15 MODERN MILLS, 25-MILLION BARRELS ANNUAL CAPACITY

Ask the OPERATOR...



He KNOWS how it HANDLES

Or talk to the owner, too. They will tell you why the STANDARD STEEL MODEL 424 is the *most profitable distributor* that they have ever owned. Here's some of their reasons:-

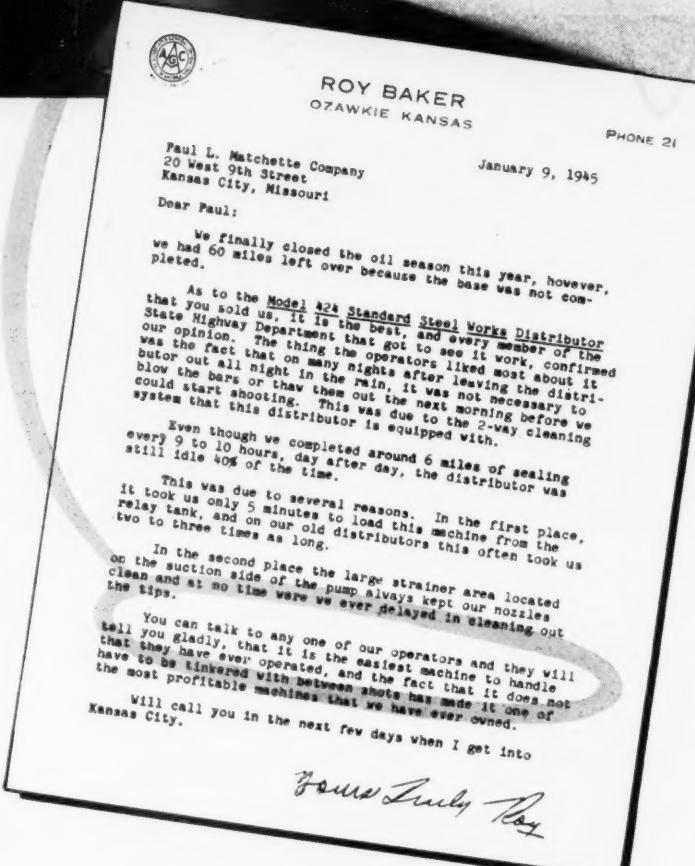
First: the gang was *never delayed* in the morning waiting for the operator to *thaw out* the unit. The TWO-WAY CLEANING SYSTEM quickly and easily cleaned out the pump, spraybar and entire piping system "... even though the distributor stood out all night in the rain it was ready to go on time the next morning".

Second: *No time lost loading*—the MODEL 424 STANDARD STEEL DISTRIBUTOR was loaded in *less than half the time* taken by other distributors.

Third: The big four inch 375 GPM pump kept the unit *way out in front* of the gravel gang "... the distributor was idle 40% of the time".

Fourth: *No hold-up between shots cleaning out spray tips* "... large strainer always kept nozzles clean." No tinkering causing costly delays "... it was one of the *most profitable machines we ever owned*".

WRITE TODAY for the name of your NEAREST DEALER.



OTHER PRODUCTS

ASPHALT DISTRIBUTORS • TAR KETTLES
MAINTENANCE DISTRIBUTORS • BURNERS
STREET FLUSHERS • SPRAY UNITS • SUPPLY TANKS
SURFACE HEATERS • SHOULDER ROLLERS

SALES OFFICES IN PRINCIPAL CITIES
Standard Steel Works
NORTH KANSAS CITY, MO., U.S.A.



MORE PRODUCTION

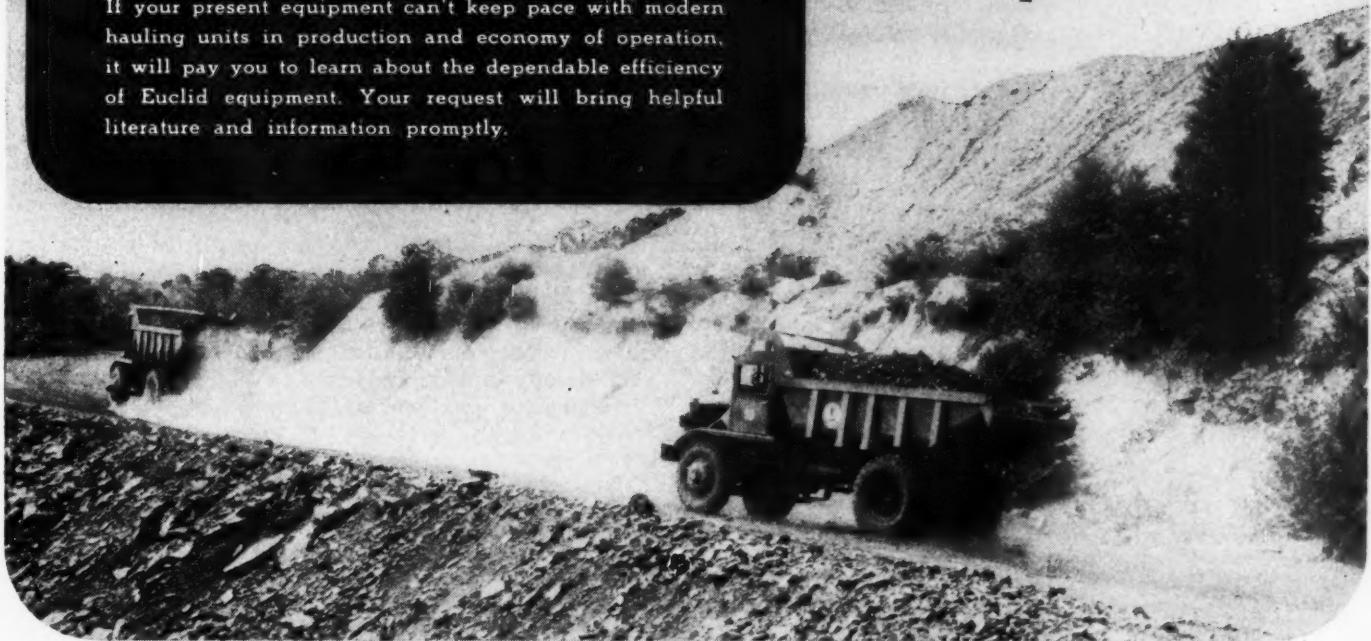
ON

*Short
AND
Long Hauls*

Most mine, quarry and construction jobs require off-the-highway hauling equipment that can handle both short and long haul work efficiently. If equipment investment and operating costs are to be kept at a minimum, hauling units must be able to do the tough jobs as well as the easy ones.

Rear-Dump and Bottom-Dump EUCLIDS are designed and constructed for just one purpose—to move large loads of earth, rock, coal, ore and other materials on off-the-highway hauls. Their rugged construction, ample power for steep grades and difficult hauls, ease of operation and speed on the haul road are reasons why Euclids move more tons or yards per hour on short or long hauls.

If your present equipment can't keep pace with modern hauling units in production and economy of operation, it will pay you to learn about the dependable efficiency of Euclid equipment. Your request will bring helpful literature and information promptly.



The EUCLID ROAD MACHINERY Co. Cleveland 17, Ohio

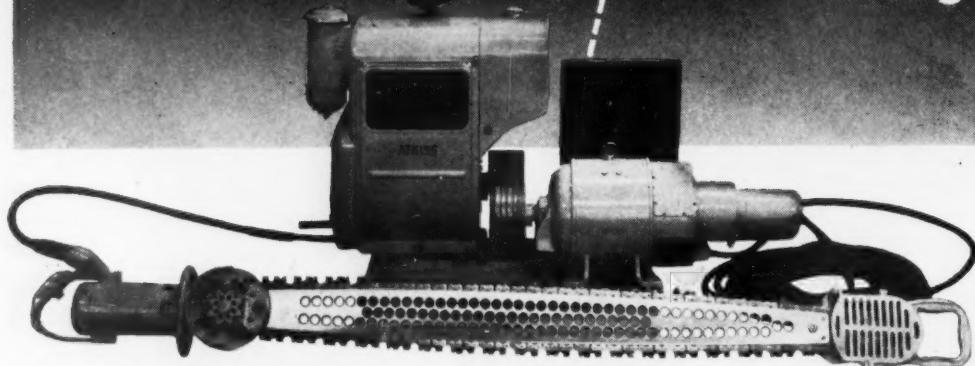
EUCLID

SELF-POWERED
HAULING EQUIPMENT
For EARTH ROCK COAL ORE



ATKINS Saws

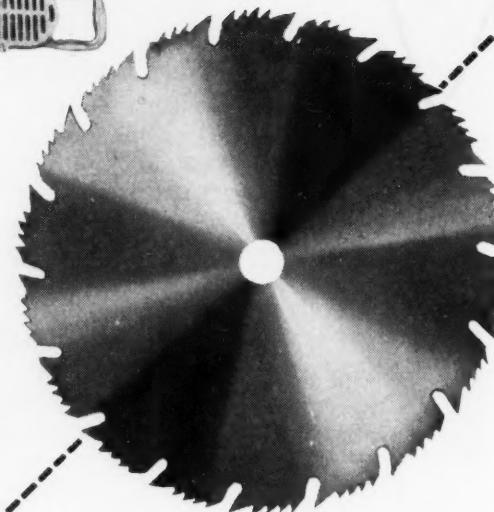
SPEED UP THE JOB!



ATKINS CHAIN SAWS—Shown here is the Atkins Chain Saw "Package Unit," a version of the chain saw that contractors are finding mighty useful for heavy duty sawing. It consists of an air-cooled gas engine and generator mounted for use on tractor, truck or trailer. This unit is light, dependable under all climatic conditions, easy to handle. It can be operated 1000 feet from the generator unit.



ATKINS HAND SAWS—Well-liked wherever hand sawing is done, Atkins Hand Saws, like the No. 65 Straight Back, are all made of Silver Steel for keen edge-holding qualities. Sturdy Hand Saws by Atkins cut smoothly as well as quickly, help you get more work done in less time.



ATKINS CIRCULAR SAWS—For portable power saws or saw tables, Atkins No. 37 Tooth Mitre Saw is favored for general work. It is one of the full line of Atkins Silver Steel Circular Saws. All are distinguished by their ability to cut cleanly at high speeds, turn out greater quantities of work with less filing.

SAWS FOR *every* NEED

Whatever your need for saws, Atkins has the type and quality to help you do the job faster and at lower cost. In addition to the saws shown, the Atkins line includes Hacksaws and Blades, One and Two-man Crosscut Saws, Docking Saws, and many special types. Ask your dealer for further information on any of them. Let Atkins help speed up your operations!

E. C. ATKINS AND COMPANY • 485 S. Illinois Street, Indianapolis 9, Indiana
AGENTS OR DEALERS IN ALL PRINCIPAL CITIES THE WORLD OVER

In war or peace
B.F. Goodrich
FIRST IN RUBBER



5169½ hours

THIS tire, an 18.00-24 20-ply, was removed from service in a strip mine after 5169½ hours of service. Throughout its life this tire was used on a power wheel of a bottom dump truck. It was never off the wheel during three years of use. Average service of all B. F. Goodrich Universal tires on this same operation has been over 4000 hours. Other tires tried out averaged less than half that service.

This tire is built on a new principle of tire construction, with a *shock shield* under the tread to provide greater protection against separation, bruising, and blowouts. The *shock shield* is a set of four breakers, layers of rubber-coated rayon cord fabric, insulated with cushionings of special shock-resisting rubber.

Under impact the cords in these

breakers stretch together—not across each other—and return to their original position, distributing the force of the blow and allowing it to be absorbed by the rubber between them. Thus the shock passed on to the cord body of the tire is greatly reduced.

With greater resistance to bruising and to ply separation, you get longer tire life on the hardest jobs.

All B. F. Goodrich off-the-road tires are made with special compounds which resist cutting. And they are available in five different tread designs, each built for maximum service on a particular type of operation.

Users say their records show B. F. Goodrich tires often last twice as long—and with fewer delays and smaller repair bills.

We urge every user of off-the-road equipment to try B. F. Goodrich tires alongside of other makes. Keep accurate service records. Compare natural rubber tires with natural rubber, synthetic with synthetic, and prove to yourself that you can save money with B. F. Goodrich tires.

Supplies of most sizes of off-the-road tires are strictly limited. It is well to place tentative orders early. See the local B. F. Goodrich dealer for information, or write us direct. *The B. F. Goodrich Co., Akron, Ohio.*

B. F. Goodrich
Truck & Bus Tires

Whatever you call it... detergency dispersancy or peptizing action

**Stanolube HD has that quality
which keeps engines clean**

THE QUALITY in a truly HD (heavy-duty) motor oil that keeps engines clean has been given many names—detergency, dispersancy, or peptizing action are some. Regardless of the name you give it, *what* that quality is, and *why* it keeps engines clean, are of utmost importance to you.

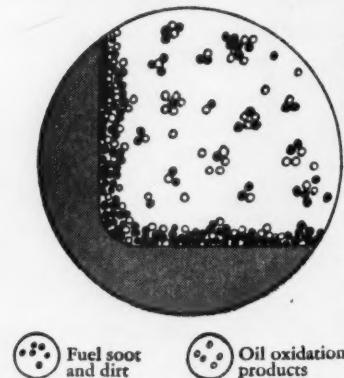
A simplified description at the right explains the difference between conventional, oxidation-inhibited motor oil, and those that have *both* added oxidation inhibiting and detergency or dispersancy properties—such as Stanolube HD. It explains why Stanolube HD keeps engines free from varnish and other engine deposits even under severe service demands.

You can get much more positive and convincing proof of the advantages of Stanolube HD by testing it on some of the hard-worked engines in your fleet. A Standard Oil Automotive Engineer will be glad to help you make such a test or show you actual fleets—perhaps near you—where Stanolube HD has provided clean engine operation when other oils have failed.

Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois, for the Automotive Engineer nearest you.

Cause of Engine Deposits Most troublesome engine deposits are caused by: (1) Fuel soot which originates in the combustion chamber and dust that enters the engine. (2) Oil deterioration products caused by excessive heat and agitation of the oil in the presence of oxygen. Both types of contaminants tend to accumulate more rapidly under heavy-duty service than in normal operation.

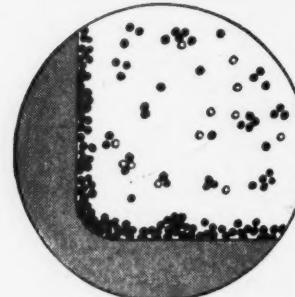
Why deposits occur in conventional oil



Fuel soot and dirt Oil oxidation products

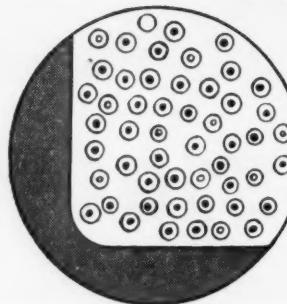
The first diagram shows how these typical contaminants are theoretically present in a used conventional oil. They have a tendency to adhere to each other and settle out of the oil, depositing on engine surfaces such as crankcases, pistons, oil screens, oil lines, and bearings.

An oxidation-inhibited oil gives only partial protection



remaining oxidation products from depositing in the engine.

Effect of an oxidation inhibitor plus a detergent in Stanolube HD



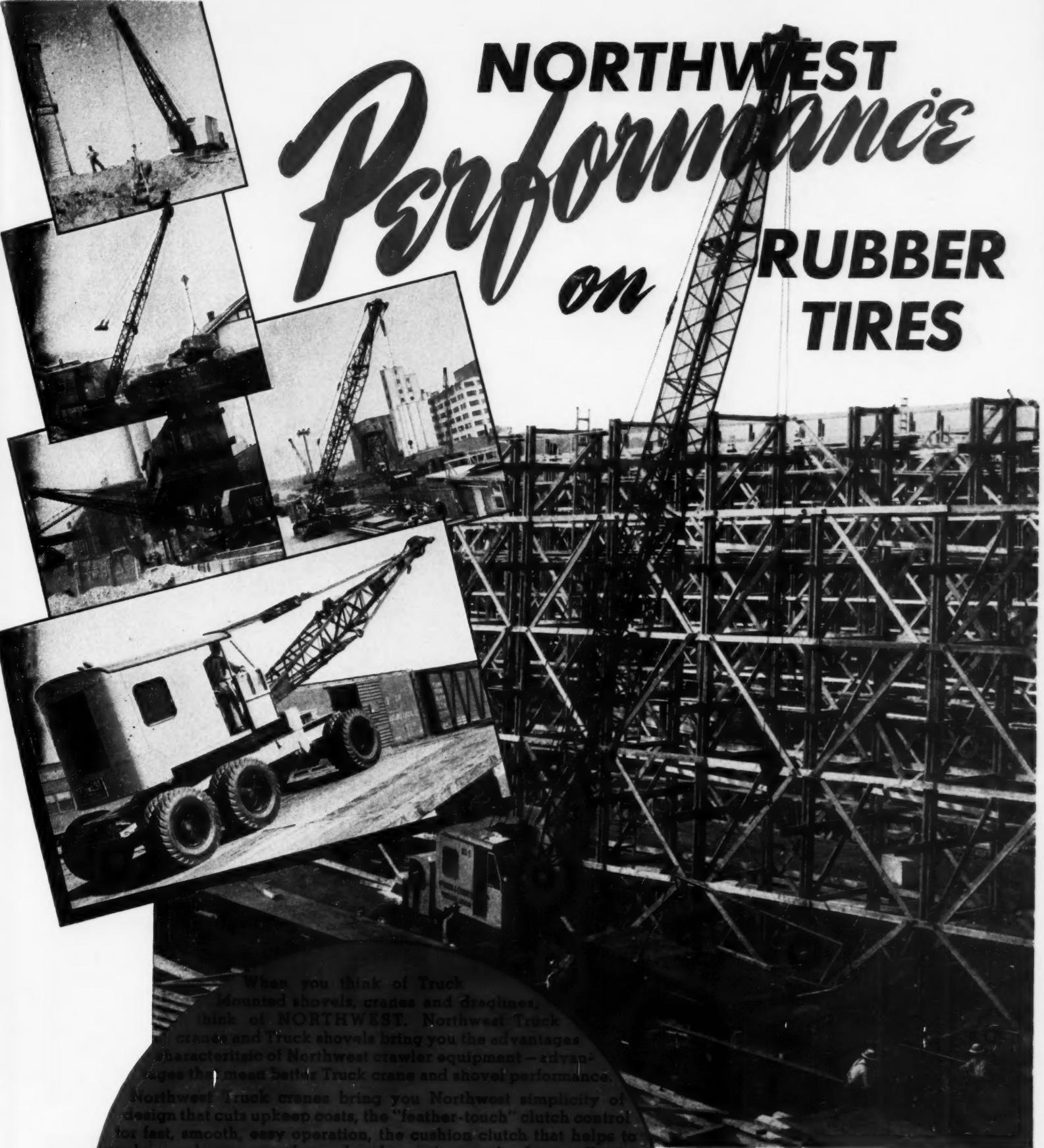
In order to render harmless all potential deposit-forming contaminants, Stanolube HD contains a combination oxidation inhibitor and detergent additive. The third diagram illustrates how the detergent theoretically surrounds all of the contaminants in the oil, including the small amount of oxidized oil present, with a film which prevents them from adhering to each other or to interior engine surface. It holds them in suspension in the oil until they are removed by filtering or draining, thereby eliminating troublesome deposits. A true heavy-duty oil has both detergency and oxidation stability.

Gasoline Powers the Attack . . . Don't Waste a Drop!

STANDARD OIL COMPANY (INDIANA)

STANDARD SERVICE

★ FLEET CONSERVATION SERVICE



NORTHWEST *Performance* on RUBBER TIRES

When you think of Truck-mounted shovels, cranes and draglines, think of NORTHWEST. Northwest Truck crane, and Truck shovels bring you the advantages characteristic of Northwest crawler equipment—advantages that mean better Truck crane and shovel performance.

Northwest Truck cranes bring you Northwest simplicity of design that cuts upkeep costs, the "feather-touch" clutch control for fast, smooth, easy operation, the cushion clutch that helps to make ample power safer and reduces the overloads on all parts under power, the uniform pressure swing clutches that take the nerve-wrecking jerks out of swinging, ball and roller bearings on all high speed shafts, the helical gear drive and many other Northwest features that have been proved in years of service on the big jobs of the country.

If you need truck mobility and want the smooth performance and high output for which Northwests have always been famous, check us on Northwest for your future plans.

NORTHWEST ENGINEERING CO.
1728 Steger Bldg., 33 E. Jackson Blvd.
Chicago 4, Illinois



NORTHWEST
for **TRUCK**
CRANES



Why is one brand of wire fabric reinforcement so widely used in concrete construction? Because architects, engineers and contractors know that American Welded Wire Fabric is the ideal material for concrete reinforcement.

THEY have proved their preference by installing billions of square feet of this high-yield-point, cold-drawn, welded wire fabric in walls, floors, roofs, roads, streets, concrete pipes, ramps, airports—literally all sorts of reinforced concrete work.

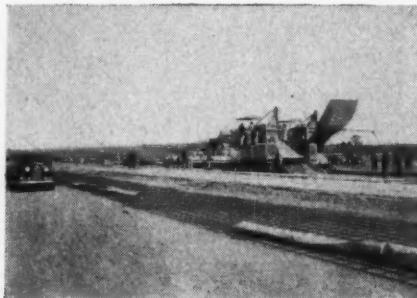
For concrete pipe, welded wire fabric is the most practical reinforcement. It stays in place, is quickly and easily shaped.



Easily handled, quickly installed, this steel backbone of concrete enables the slab to withstand impact, stresses and strains in every direction.

This practical, economical reinforcement lies flat, stays in place. On jobs where American Welded Wire

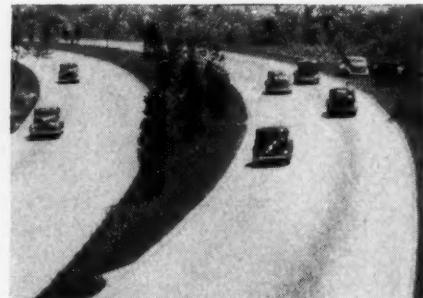
For airport runways and other wide lane concrete work welded wire fabric is the most adaptable reinforcing material.



Fabric is used for reinforcement, construction time and costs are reduced, a permanently safe, long-lasting structure is assured.

We shall be glad to consult with you on concrete reinforcement problems and to send you detailed information on the many and varied uses of American Welded Wire Fabric. Drop us a line today, without obligation.

In thousands of miles of modern concrete highways, welded wire fabric reinforcement insures additional years of trouble-free service.



AMERICAN STEEL & WIRE COMPANY

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Columbia Steel Company, San Francisco, Pacific Coast Distributors

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UNITED STATES STEEL

**AMERICAN
WELDED
WIRE FABRIC**

THE FIRE THAT *Didn't* START



Another serious construction fire averted, because FIRE CHIEF Canvas will not flame or support combustion.

This HOOPERWOOD "Engineered Canvas" is equally resistant to water, weather and mildew, greatly lengthening its life in service.

Wherever unprotected canvas presents a fire hazard from hot coals, sparks, hot rivets, welding operations or workmen's torches, carelessly-thrown cigarettes and matches — FIRE CHIEF-Finished Hooperwood Duck assures new safety.

Approved by the Underwriters Laboratories and the Associated Factory Mutual Fire Insurance Companies, FIRE CHIEF also meets all Government requirements for fire, water, weather and mildew resistant canvas.

Specify FIRE CHIEF for protection.

WM. E. HOOPER & SONS CO.
PHILADELPHIA Chicago
New York Mills: WOODBERRY, BALTIMORE, MD.

• *Fire-Chief Finished* •
HOOPERWOOD COTTON DUCK •
(PATENTED)

a

HIT



WITH EXPERIENCED OPERATORS

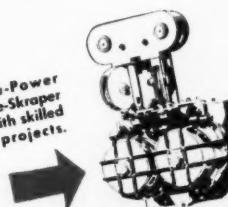
"Today it is still the favorite unit on the job", is the way one operator expresses his individual enthusiasm for his Isaacson Kable-Power Unit. Acquired before Pearl Harbor, it is giving continuous service on gruelling construction work in the Pacific Northwest. "It's the best, yet", says another who operates a fleet of cable units. These are people who know equipment, value dependability, smooth operation and long service. The heart of cable operation to them is in the Cable Power Unit. A unit that holds its adjustments longer, eliminates tedious tuning-up periods, is simple in design and sturdily constructed is a big hit in these days of war time stress and crushing demands on tractor equipment. They can depend on their Isaacson Kable Power Unit. It won't let them down.

Front mounted Isaacson Kable-Dozers give constant power although tractor master-clutch is disengaged and they allow rear end to be free for rear power-take-off equipment.

Isaacson "Model HHL" Kable-Power Unit is rear mounted for Kable-Scraper operation and is another "Hit" with skilled operators on earth moving projects.



See your industrial Tractor Dealer, he is qualified to assist you with your tractor equipment problems.

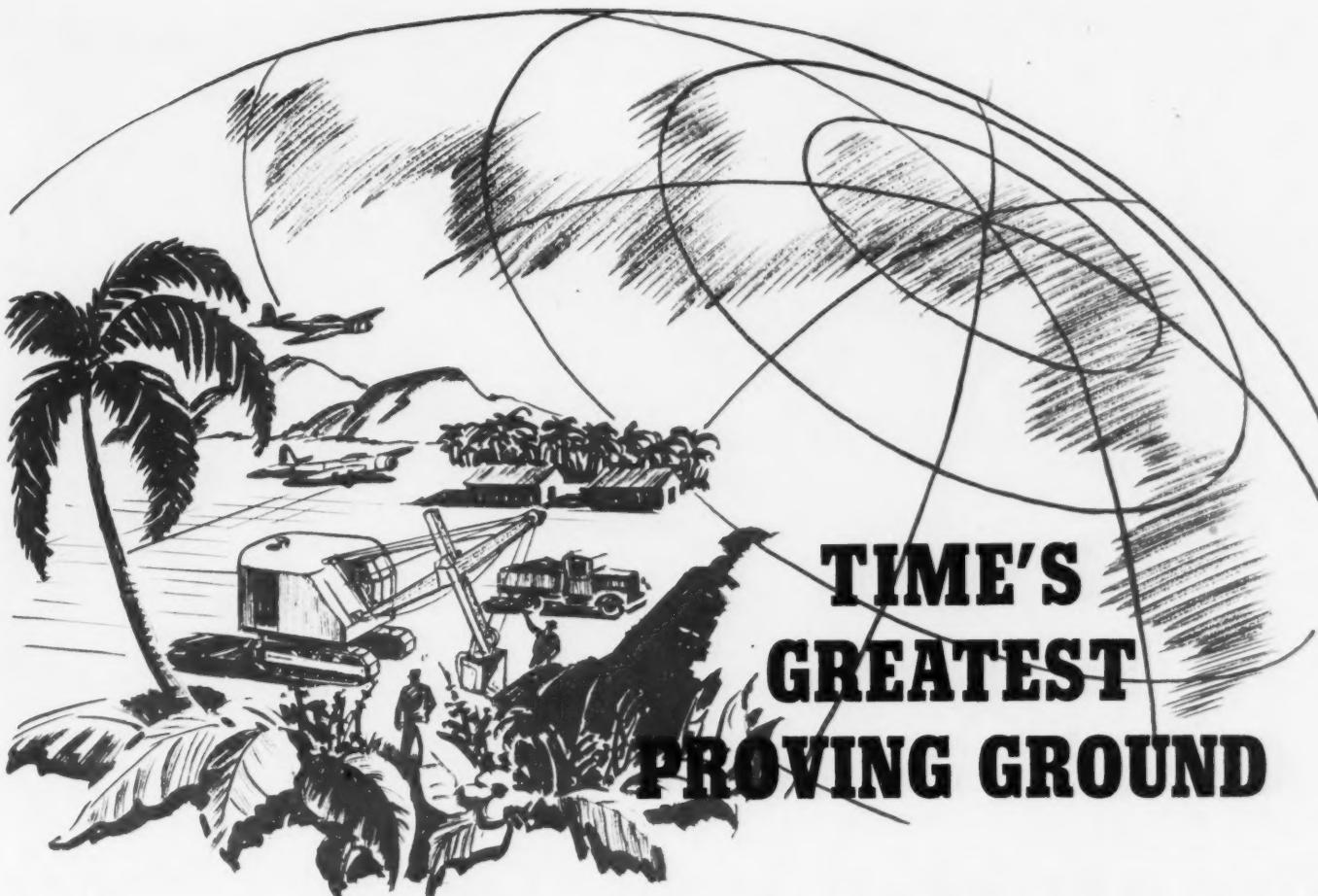


ISAACSON

Iron Works

SEATTLE

ENGINEERED TRACTOR EQUIPMENT



TIME'S GREATEST PROVING GROUND

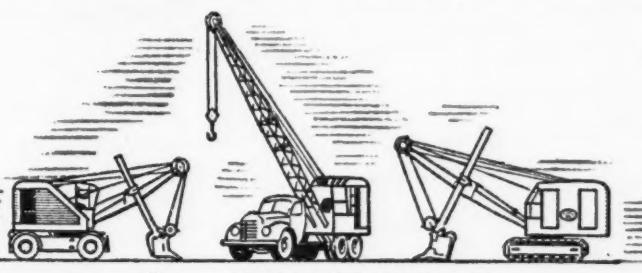
The world-wide scope of World War II makes possible new and varied performance testing for construction equipment that is used by the Armed Forces and by war contractors.

The pressure under which Byers shovels and cranes are working on this greatest proving ground of all time probably comes more close to the ideal speed-up-life-test than any peace time jobs could provide. Thus the experience gained during this period when Byers new models of excavators are not available for general distribution is helping

Byers engineers develop these new shovels and cranes to a high degree of efficiency.

When they become available to you, you will be assured of thoroughly dependable, experienced Byers shovels and cranes in which every

new and improved feature has a background of performance tests that qualify the entire machine for postwar work.



THE BYERS MACHINE CO.

★ Ravenna, Ohio ★

Distributors throughout the World



How a Bucket Loader Can Save Money *the Year 'Round*

Truck loading time is cut to a minimum by the continuous operation of a Barber-Greene Bucket Loader. But more than that, the B-G Loader has year-round utility . . . can hustle along some construction or maintenance job each season.

★ The B-G Loader yields higher yardage, with less power, less weight, and less cost than any other method.

★ It can effectively handle a variety of loose materials—soil, sand, cinders, gravel or roadway debris.

★ Clean pick-up is assured with the fol-

low-up scraper that cuts to grade and does light excavating.

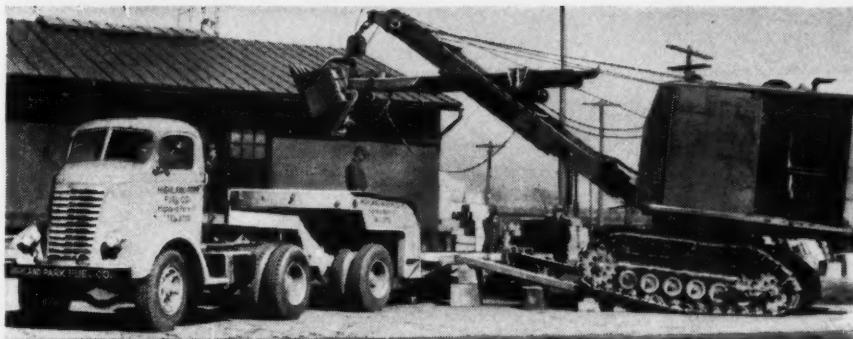
★ Top performance in stockpile or semi-compacted natural deposit loading, light excavating, shoulder shaping or stripping to grade can be maintained with the 12 selective crowding speeds.

★ By substituting a B-G Snow Loader boom, the B-G Loader can be used for street snow removal.

Ask your B-G representative for details on the versatility and economy of B-G Bucket Loaders. Barber-Greene Company, Aurora, Illinois.

Barber-Greene  Constant Flow Equipment





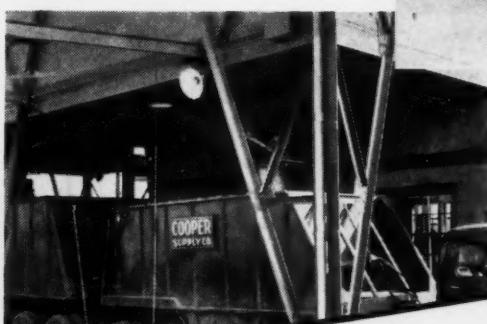
Fruehauf Carryalls—are built to "Take it." They make light work of heavy hauling regardless of the size of the job.



Above—**Fruehauf Gravel Dump Models**—handle deliveries with speed and economy for the operator.



Crushed Stone Dumps—provide rugged construction to handle heavy loads.



Left—**Hopper Trailer "Trains"**—speed construction work and cut costs.

Name the Job!

Fruehauf Engineers Design the Correct Trailer to Handle It!

- Every hauling problem is handled by Fruehauf engineers as an individual problem. Fruehauf Trailers are *designed* to your exact requirements. The Trailer you need may have 4 tires or 24 tires . . . with any one of many wheel and axle combinations—any width or length to carry most any kind of load or equipment. You'll find the applications to individual needs are endless at Fruehauf.

Today is not too soon to consult with us on getting the design of your postwar Trailer through the blue-print stage—ready for the production go-ahead. This costs you nothing extra—yet it may save much valuable time later on.

World's Largest Builders of Truck-Trailers
FRUEHAUF TRAILER COMPANY, DETROIT
Service in Principal Cities



Specially designed for tar-asphalt hauling—but used for general dump and construction work.

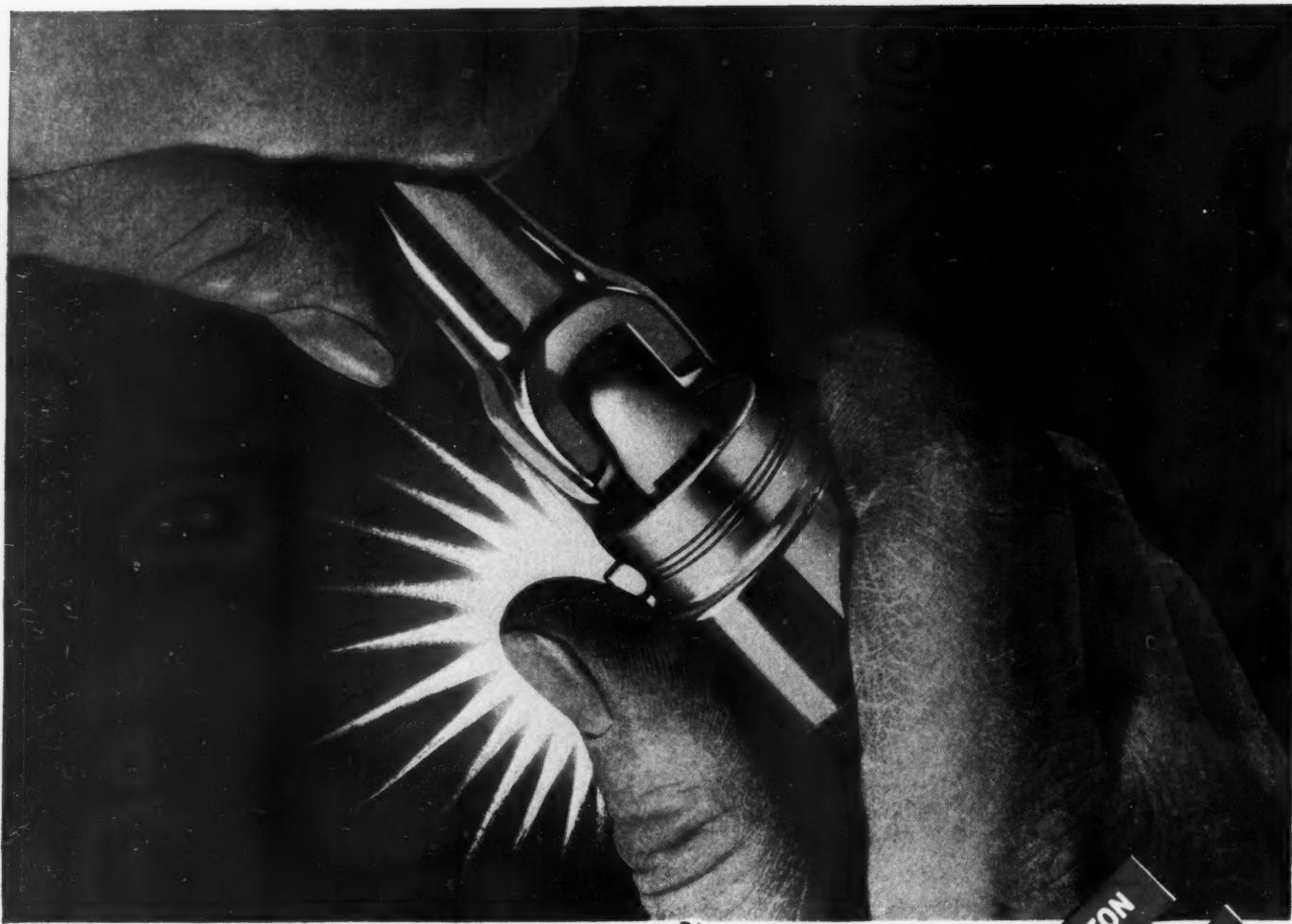
Fruehauf Trailers "ENGINEERED TRANSPORTATION"
REG. U. S. PAT. OFF.



Ready-Mix Trailer — engineered to transport mixed concrete direct to the road-building job.



Bulk Cement Haul Trailers—are fully enclosed—provide an even flow of cement—faster delivery and protection to the material.



RIGHT ON THE BUTTON!

YOU'RE RIGHT when you buy the socket wrench with the button—and only Blackhawk Wrenches have it.

Only Blackhawk gives you "Thumb-Release Lock-On"—and the "button" on the socket is the earmark of this important feature. A spring-backed plunger on the drive pushes into a sidewall hole in the socket—assuring a positive lock. Hell and high water can't make the Blackhawk Socket Wrench combination fall apart.

BUT—press the Thumb-Release Button (which floats neatly in that socket sidewall hole)—and your wrench assembly pulls apart with magical ease!

Insist on the Blackhawk Button for Speed with Safety

The Blackhawk Socket is never left on the nut when you pull away from your work. No fishing in tight spots for fallen sockets. You work faster and more safely with dependable world-famous Blackhawk Socket Wrenches!

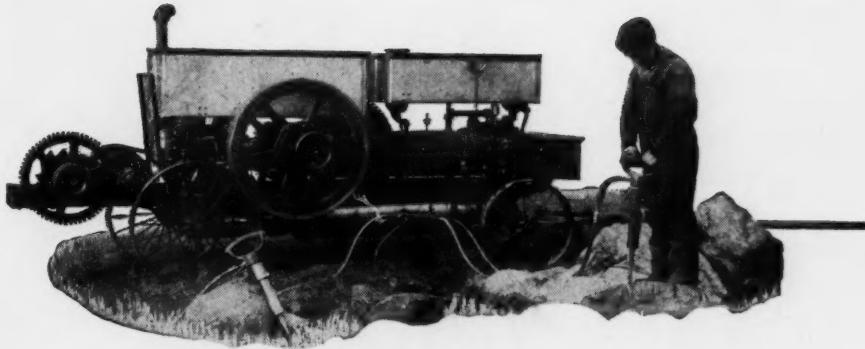
Call your Blackhawk Industrial Supply Distributor—or write to Blackhawk—for the illustrated catalog describing this complete wartime wrench line.

A Product of BLACKHAWK MFG. CO., Dept. W2325, Milwaukee 1, Wis.

BLACKHAWK

ONLY Blackhawk Gives You "Lock-On" in 3/8"-7/16"-1/2"-3/4" and 1" Square Drives





This horse-drawn Sullivan WK-3 portable air compressor was built in 1910. It was a single cylinder, horizontal unit, powered by a 15 h.p. gasoline engine. Cooling water tanks were placed on top of the unit and the receiver was fixed below. The entire assembly, when mounted on a chassis, weighed 6100 lbs. Capacity 77 C.F.M. (Actual Air).

This Sullivan WK-3 portable compressor was a far cry from its modern counterpart, the Sullivan WK-60 Plus Portable. Yet, as cumbersome as it was, it marked an important development in the construction industry. In pioneering the portable compressor, Sullivan brought dependable, economical air power right to the job.

During the 34 years since the introduction of the WK-3, Sullivan has continually improved its line of portable air compressors. Construction men know that every proved advancement in design and construction is found in Sullivan

THE WORLD'S FIRST PORTABLE AIR COMPRESSOR —BUILT BY SULLIVAN IN 1910



Sullivan WK-70 Zephair—Two-cylinder gasoline powered unit with standard two-wheel mounting. This model weighs 2500 lbs. and has a capacity of 85 C.F.M. (Actual Air). Sullivan portables are available with capacities ranging from 60 C.F.M. to 365 C.F.M.

Plus Portables. Micro-lift valves, anti-friction main bearings, controlled air cooling, super intercooling, forcefeed lubrication and complete accessibility are but a few of the reasons for the economical, dependable performance of Sullivan portables.

The progress Sullivan has made since 1910 will continue, assuring construction men even finer Sullivan portable compressors in the future. Sullivan Machinery Company, Michigan City, Indiana. IN CANADA: Canadian Sullivan Machinery Co., Ltd., Dundas, Ontario.

SULLIVAN

MICHIGAN CITY, IND. CLAREMONT, N. H.



PRODUCTS—Portable Compressors • Stationary Compressors • Rock Drills • Wagon Drills • Core Drills • Portable Hoists • Spaders • Paving Breakers • Trench Diggers • Sheetng Drivers • and other Pneumatic Tools.

OFFICES—Birmingham • Boston • Butte • Chicago • Claremont • Dallas • Denver • Duluth • El Paso • Huntington • Knoxville • Los Angeles • Middlesboro • New York • Philadelphia • Pittsburgh • Portland • Salt Lake City • San Francisco • Seattle • Spokane • St. Louis • Washington, D. C.



TEXACO

TUNE IN THE TEXACO STAR THEATRE WITH JAMES MELTON SUNDAY NIGHTS ETC

Construction BACKLOG

HALTED by the war, construction on the 11,000-ft. Brooklyn-Battery Tunnel in New York City will be resumed when 790 tons of giant nuts and bolts—such as shown in inset—become available. The tunnel, still three years from completion, is only one project of a post-war construction backlog already estimated at over 15 billion dollars.

On every type of construction job—from tunnels to skyscrapers, from bridges to sewers—construction machinery performs more efficiently, requires fewer repairs when lubricated effectively. To more and more operators everywhere, this means Texaco.

Texaco Ursa Oil X★★ for Diesels and heavy-duty gasoline engines, for example, assures better compression and combustion, greater fuel economy and more power because special additives give this heavy-duty oil the

valuable properties of detergency and dispersion. Its detergency keeps piston rings free and engine parts clean. Its dispersive ability holds deposit-forming materials in suspension until normal drain periods. *Ursa Oil X★★* protects alloy bearings and prevents scuffing of rings, pistons, cylinders.

For quieter-running, longer-lasting transmission and differential gears, use Texaco transmission and differential lubricants.

Texaco lubricants have proved so effective in service they are definitely preferred in many fields, a few of which are listed below.

Texaco Lubrication Engineering Service is available to you through more than 2300 Texaco distributing points in the 48 States.

* * *

The Texas Company, 135 East 42nd Street,
New York 17, N. Y.

THEY PREFER TEXACO

★More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

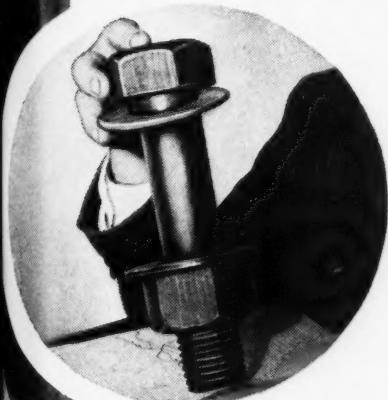
★More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.

★More locomotives and railroad cars

in the U. S. are lubricated with Texaco than with any other brand.

★More revenue airline miles in the U. S. are flown with Texaco than with any other brand.

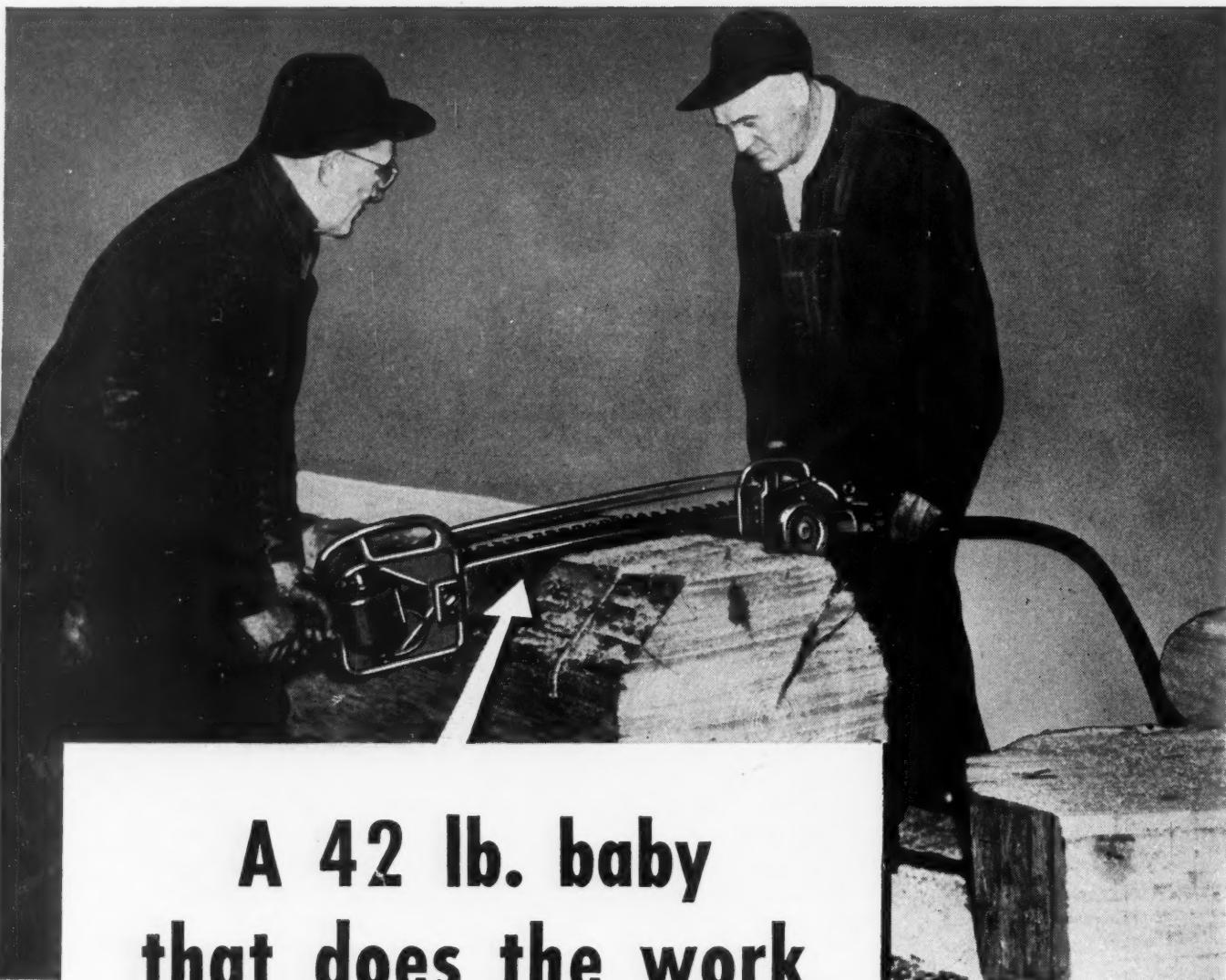
★More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.



Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

IGHTS METROPOLITAN OPERA BROADCASTS SATURDAY AFTERNOONS



A 42 lb. baby that does the work of 10 men!

For construction that involves heavy cutting, for clearing roads, or any work having to do with sawing or felling trees or heavy timbers, the new Lombard air-driven chain saw is the baby that does the job of ten men.

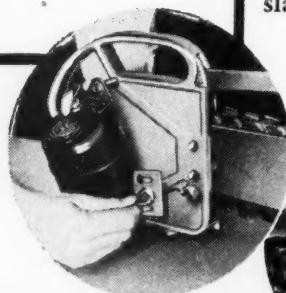
Weighing only 42 pounds — 10% less than other makes — this husky air-driven, 24 inch tool goes through soft wood at an average of about an inch a second — hard wood in about double this time. Cuts a clean, even track. Operates from a standard 105 cu. ft. compressor. Ideal for under-water cutting. Will cut standing trees within 2 inches of the ground.

Inexperienced hands find it easy to operate. It cuts readily at any angle. Safety guard offers full protection. New quickly detachable helper's end and new quick-change interlocking chain are exclusive with Lombard's advanced engineering design.

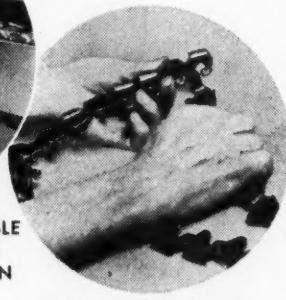
Also available in 3 h. p., 60 cycle, 220 volt, 24 inch and 36 inch cutting blades. Write for literature.

Dealer Opportunities in Some Areas

Cutting an octagonal boom of 24 inch Oregon fir, after having made longitudinal slab cuts.



NEW EASILY DETACHABLE
HELPER'S END WITH
ONE-SHOT LUBRICATION



NEW QUICK-CHANGE
INTERLOCKING CHAIN



LOMBARD
GOVERNOR CORPORATION

ASHLAND, MASSACHUSETTS

INCREASE YOUR YARDAGE with **Firestone TIRES**



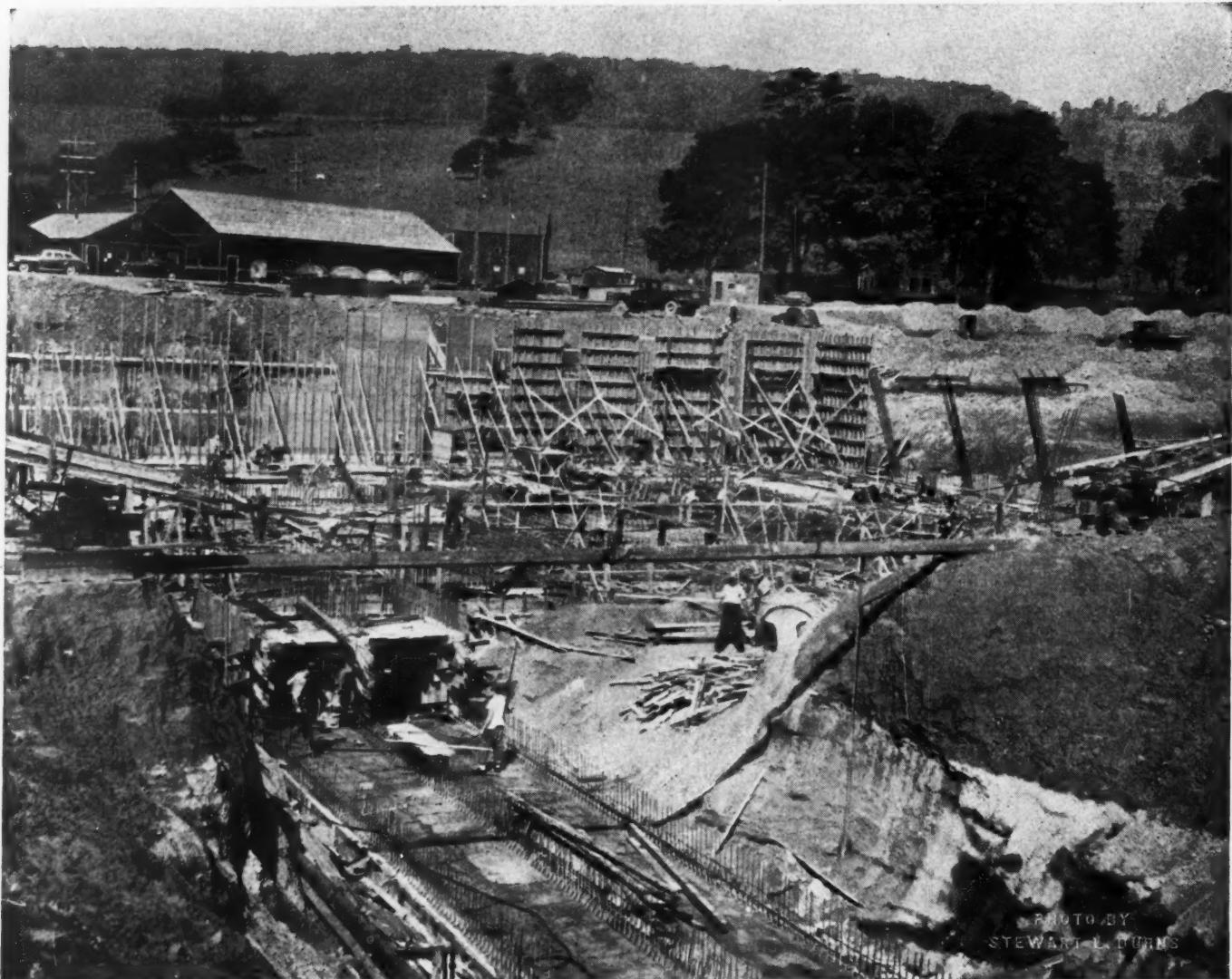
AS A CONTRACTOR you are ever searching for ways and means to increase your yardage . . . to work more hours per season with less time out for repairs . . . to lower your maintenance costs . . . *to increase your profits.* Today your answer lies in power-driven equipment mounted on Firestone tires.

These big, tough, rugged tires make the operation of modern earthmoving equipment more profitable. Firestone, the pioneer builder, has the advantage of more extensive research and actual field service to build a tire to do your job better. Their strength and quality keep them on the job longer. That is why, with Firestone tires on your equipment, you can move earth at the lowest cost.

Listen to the Voice of Firestone with Richard Crooks and the Firestone Symphony Orchestra, under the direction of Howard Barlow, Monday evenings, over N.B.C.

Copyright, 1945, The Firestone Tire & Rubber Co.

FIRESTONE OFF - THE - HIGHWAY TIRES



*Another
Reason*

WHY MORETRENCH WELLPOINT SYSTEMS ARE PREFERRED PUMPING EQUIPMENT ON A WET JOB

On most projects where a MORETRENCH WELLPOINT SYSTEM controls the water, the ground is stabilized to such an extent that costly sheeting and bracing are unnecessary.

On the foundation shown above, sheeting over the entire project was eliminated except for that portion of the tunnel which was constructed underneath the main building. The contractors were thus able to carry on their operations over an extended area, and to excavate and concrete at subgrade elevations at the same time that full length wall form panels were being erected.

TIME AND MONEY SAVED! Of vital importance on the jobs of today—of equal importance on the jobs of tomorrow. We welcome your inquiries on present or post-war work.

MORETRENCH CORPORATION

90 WEST STREET, NEW YORK 6

NEW ORLEANS 13, LA.
321 EUTERPE ST.

ROCKAWAY, NEW JERSEY

CHICAGO 23, ILL.
3037 SO. CHRISTIANA AVE.

*Only an
ADNUN
can lay
BOTH—*

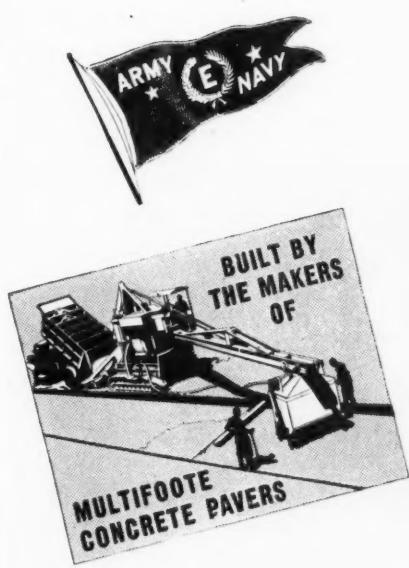


LAYING crushed stone or slag in depths up to six inches, or sheet asphalt only a fraction of an inch thick are everyday jobs for an Adnun. The material can be hot or cold and the width and depth can be controlled to meet any specification.

The combination of Adnun features—Power Cut-Off, Cutter Bar Strike-Off, and Continuous Course Correction produce a final surface smoothness unexcelled by any other method. The power cut-off provides positive control of the flow of materials. The cutter bar strikes off the material to the correct thickness and has an overlapping and crowding action that makes a tight, positive joint with parallel course or curb, greatly reducing hand labor back of the machine.

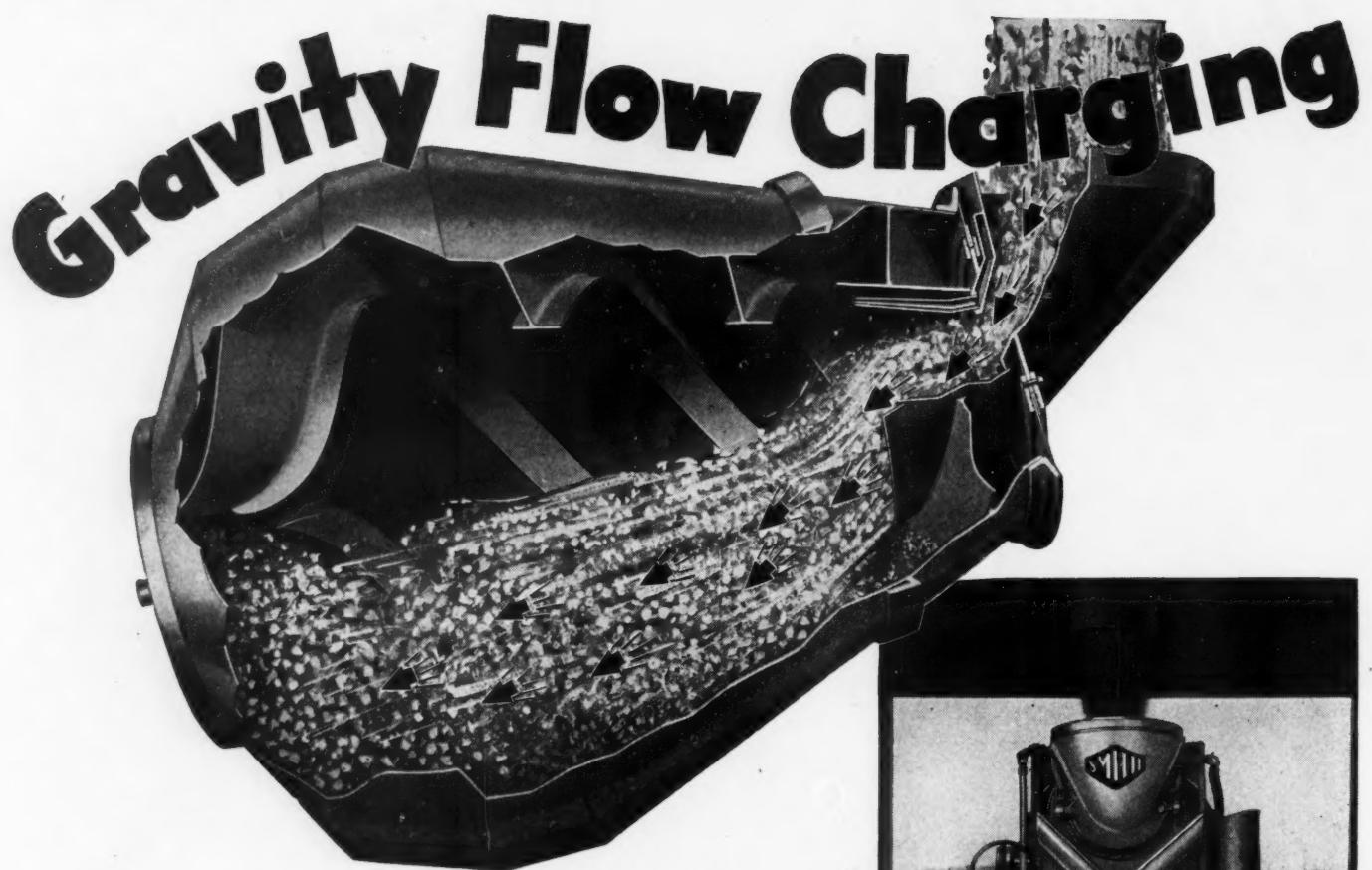
Continuous course correction automatically corrects hollows and bumps with each successive course. These features particularly fit the Adnun for highway or airport building with the minimum of subgrade preparation and insure a smoother surface even with perfectly finished subgrades. Write today for details or see your Foote distributor.

THE FOOTE CO., INC. 1910 State Street, Nunda, N. Y.
THE WORLD'S LARGEST EXCLUSIVE MANUFACTURERS OF CONCRETE AND BLACK TOP PAVERS



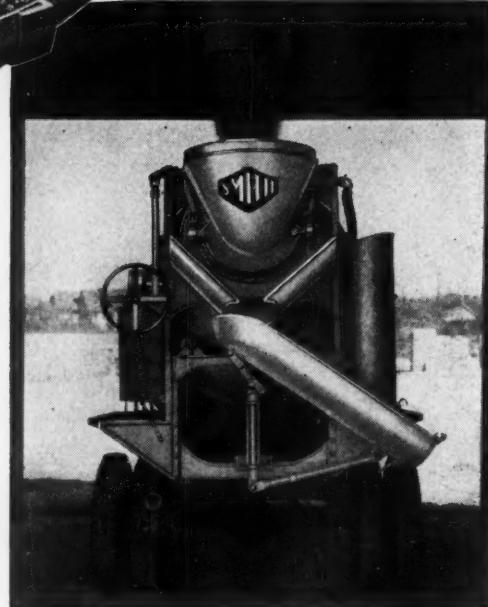
ADNUN
TRADE MARK REGISTERED
BLACK TOP PAVER

WITH
CONTINUOUS
COURSE
CORRECTION



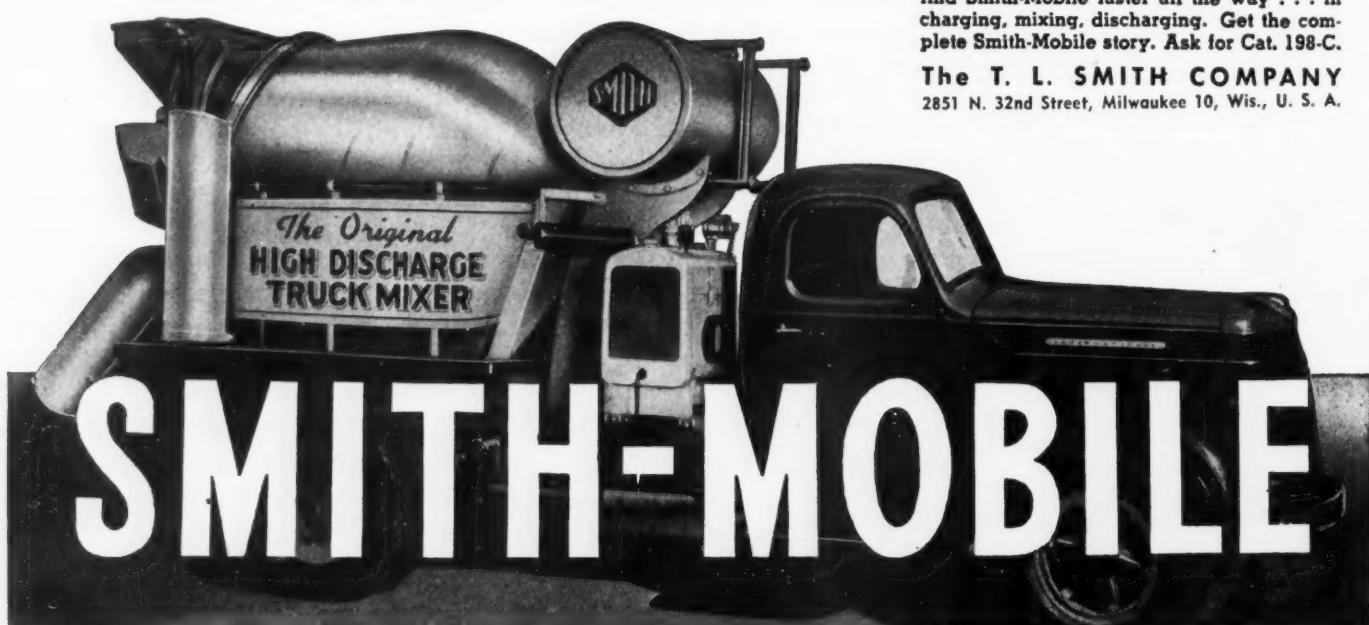
No Drum Obstructions! No Bottleneck! Materials Speed to Opposite End of Drum

Smith-Mobile's big, roomy feed chute and patented drum construction speeds up truck-mixer charging. The aggregates drop vertically into the chute and continue at high velocity through the charging cone (an exclusive and patented Smith feature) toward the opposite end of the drum. Gravity does the job! The action of the mixing blades merely accelerates the flow of the materials. There are no shafts or rods to clog up the feed chute. Smith-Mobile is by far the fastest charging truck mixer on the market.



Merely drive your Smith-Mobile into the batching plant with drum rotating in mixing position . . . receive the materials . . . and drive right out again. There's no charging "bottleneck", and mixing starts the instant the materials enter the drum. You'll find Smith-Mobile faster all the way . . . in charging, mixing, discharging. Get the complete Smith-Mobile story. Ask for Cat. 198-C.

The T. L. SMITH COMPANY
2851 N. 32nd Street, Milwaukee 10, Wis., U. S. A.





**FOUNDED
IN 1906**

**BUT, we have young ideas
about designing Crushing Plants . .**

When you buy crushing equipment—or any other kind of equipment, for that matter—the more it weighs, the more metal and labor have gone into it, the more it costs. We have long fostered the idea of cutting down weight and we have succeeded in doing so without reducing capacity or impairing efficiency. Compare modern Universal plants with heavier, bulkier plants and you will find that Universals will give you as much or greater output with even lower maintenance costs. Eliminating this excess baggage has made Universal plants easier on roads and easier to move.

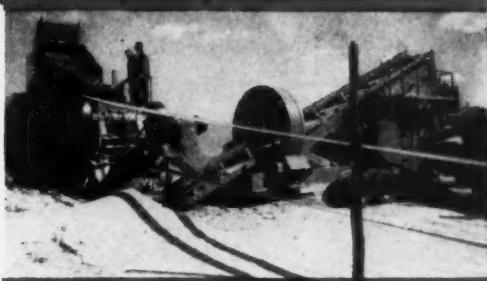
Looking back over the past 39 years you'll find Universal engineers have never been idea-shy. Starting with the overhead eccentric jaw crusher, they have given the industry many developments which have become standard. In the coming postwar period, look to Universal for new developments—continued leadership.

UNIVERSAL ENGINEERING CORP.
319 8th St. West, Cedar Rapids, Iowa

No. 800 secondary crushing and screening unit steps-up output of a number of types of primary plants.



Complete, compact "B80" primary and secondary crushing plant. At left: Two part portable quarry plant; primary jaw crusher, and secondary crushing roll and screen.



This "B22-Q" two-unit quarry plant averages 22,000 yds. monthly. Maintenance costs are low.



This practical gravel washing and sizing plant ensures lowest cost per yard of material.



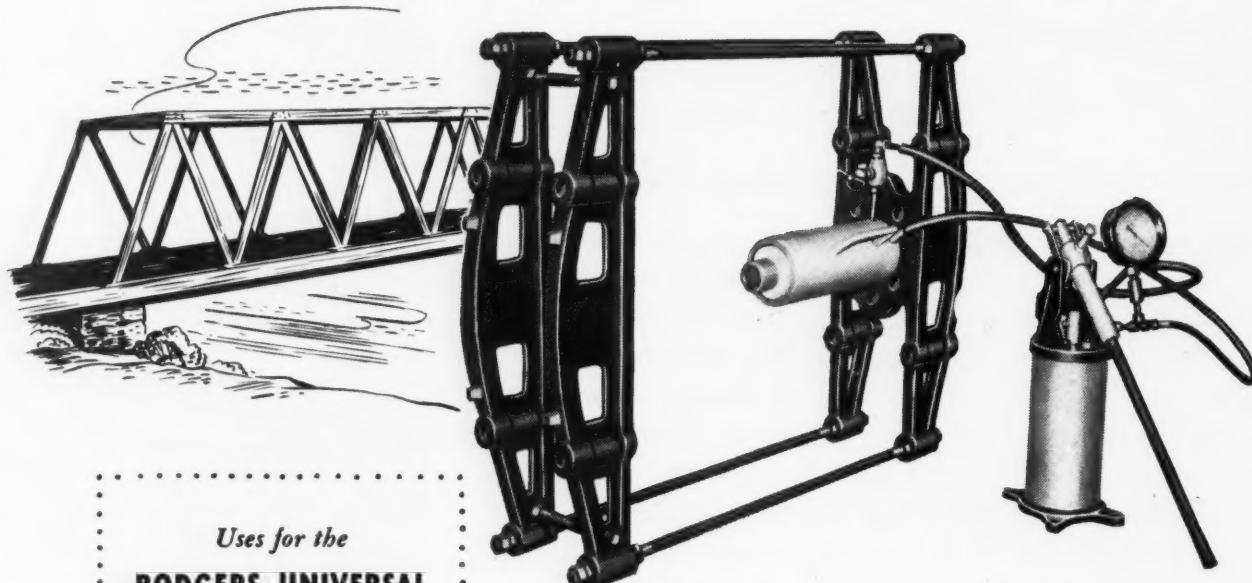
ROCK AND GRAVEL CRUSHERS, CRUSHING ROLLS, HAMMER MILLS, COMPLETE CRUSHING AND SCREENING PLANTS, WASHING PLANTS, ASPHALT PLANTS, SHEARROLLERS.

UNIVERSAL



"We took a bridge apart with our RODGERS UNIVERSAL PRESS"

... states the superintendent of a construction firm.



Uses for the
**RODGERS UNIVERSAL
HYDRAULIC PRESS**

- Gear Pulling
- Wheel Press Work
- Jacking Pipe
- Erecting Machinery
- Relocating Machinery
- All-Purpose Jack

THE PROBLEM... removing hinge pins on
an old truss bridge.

"On one job alone, dismantling an old truss bridge, our Rodgers Universal Press paid for itself several times over. It enabled us to push out the hinge pins quickly and easily, effecting a tremendous saving in time, labor and material."

"In another instance we used our Rodgers Universal Press with a spread footer to push a concrete wall into proper alignment. That's adaptability—we originally bought this portable press equipment for overhauling and repairing our shovels and crawler-type tracks."

You can use the Rodgers Universal Hydraulic Press in any place or any position where pulling, pressing, or lifting power is needed. When emergencies arise, be ready with a Rodgers!

*If it's a Rodgers,
it's the best in Hydraulics.*



4 SIZES—one for your job... write today for full information!



RODGERS HYDRAULIC, INC.

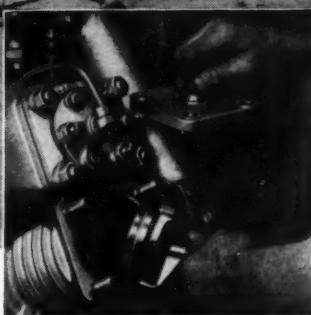
7403 Walker Street, St. Louis Park, Minneapolis 16, Minnesota.

AIR
PLUS

JAEGER COMPRESSOR



VALVED WITH "TOUGH SWEDISH TWINS" FOR
AIR PLUS-C-O-O-L-N-E-S-S . . . EXTRA BIG,
AIR-ANIMATED, AND COMPLETELY ACCESSIBLE!



The low temperature and minimum of oil vapor and condensation in the air delivered by "Air Plus" Compressors are evidence of the efficiency of Jaeger's "Tough Swedish Twin" Valves, horizontal fin-cooled cylinder design and an inter-cooler system which automatically unloads and drains during every idling period. All sizes, 60 to 500 feet.

THE JAEGER MACHINE COMPANY, COLUMBUS 16, OHIO



"FLEET-FOOT"
Crane-Loaders



"SPEEDLINE"
Concrete Mixers

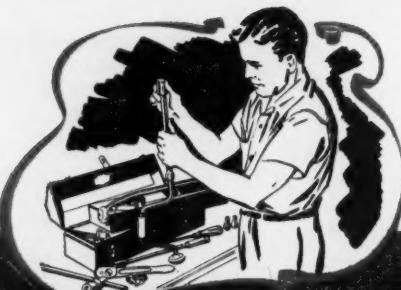


"SURE PRIME"
Contractors Pumps

JAEGER
Engineered EQUIPMENT

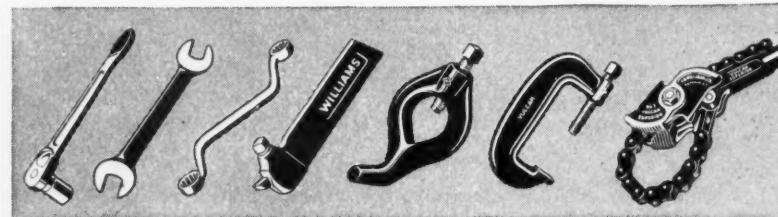
JAEGER-LAKewood SPREADERS, FINISHERS AND BITUMINOUS
PAVERS, FORMS, FORM TAMPERS—"DUAL-MIX" TRUCK MIXERS,
AGITATORS—JAEGER HOISTING ENGINES, TOWERS

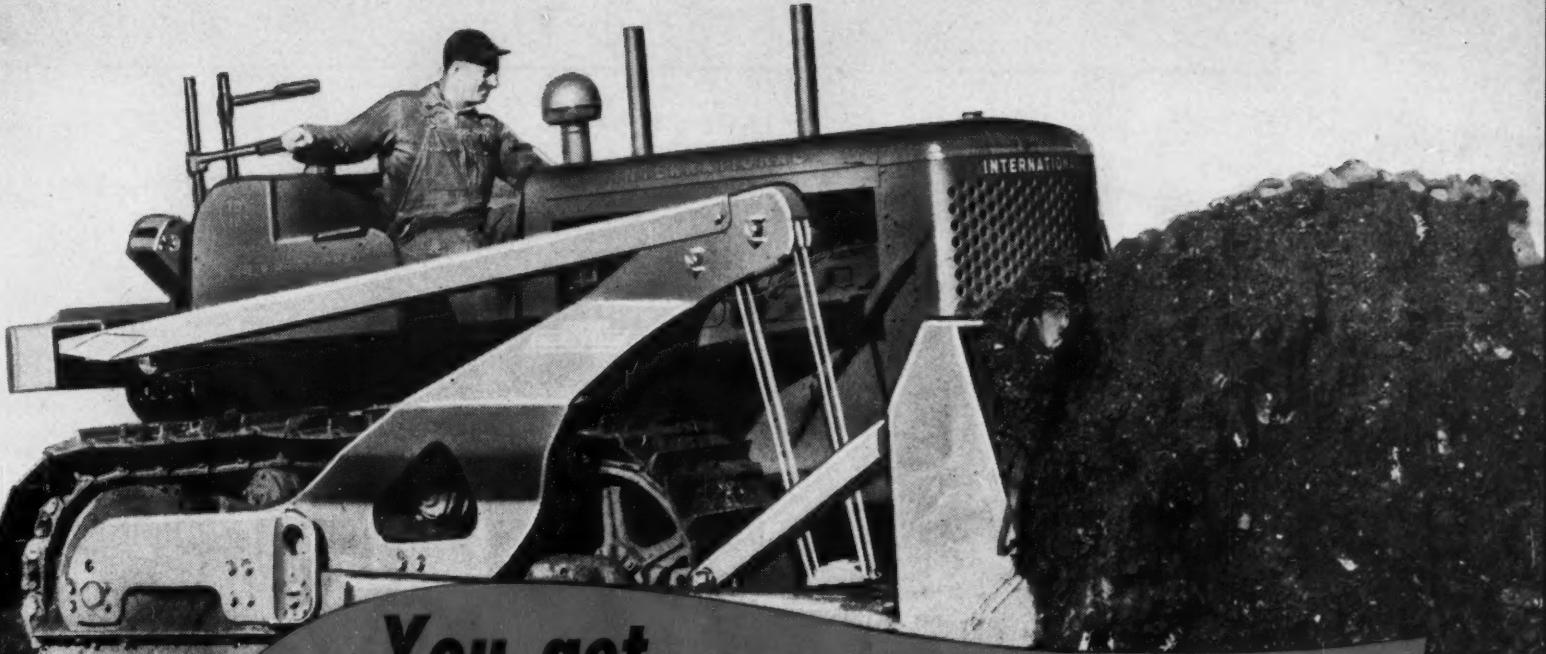
Multiplying SKILLED HAND POWER



Williams' "Supersockets" actually are more than wrenches; they are an extremely flexible system for multiplying the skill and productivity of human hands. "Supersockets", with their almost endless combinations of handles, parts and different socket types, enable the operator to assemble a special tool to fit exactly the particular job at hand.

Five different patterns, with drives ranging for $1/4"$ to $1"$ square, cover every conceivable industrial application. They provide the utmost in speed, safety and power. These rugged, time-saving tools are sold by Industrial Distributors everywhere. Descriptive literature will be mailed on request. J. H. Williams & Co., Buffalo 7, N. Y.





**You get
bigger loads and more profits**

with dependable **HEIL**
Cable Dozers



**HEIL Hi-Speed Cable Scoops
give you extra speed on
long hauls**

This big 15-yard tractor scoop is push-loaded in 40 to 50 seconds — and hauls at travel speeds up to 20 miles per hour. The tilting floor gives positive mechanical push-out from the bowl and spreads load evenly. It's one of Heil's "bigger yardage at less cost" units that you will need in your post-war business. Write for bulletins today.

R-43

**The full power of your tractor drives
on the blade to move more "pay dirt"**

Here is a rugged unit that is easily adjusted for an extra deep bite — whether in soft dirt or hard-packed clay — to give you a heaping load. And it is just as easy to adjust this unit for side-casting to right or left — to peel a bank — to grade or ditch — or to push straight ahead.

Heil Cable Dozers have the quality features that experienced operators demand: full vision ahead — fast, positive cable control with little effort — smooth action that is easy on the tractor — and less time out for adjustments and repairs. These famous features add up to "big loads" at less cost — and more profits for you.

Write for bulletins

See Your INTERNATIONAL TRACTOR DISTRIBUTOR



THE HEIL CO.

GENERAL OFFICES

MILWAUKEE 1, WISCONSIN

HELPS BEAT*

INVESTIGATE THIS COMPLETE CO

Here's important help for contractors: A complete lubrication service that's geared to meet the needs of your fast-moving business! Finest lubricants—time-saving engineering and maintenance aids quickly and conveniently available from one source. Read the details **NOW!**

SOCONY-VACUUM
Contractor's Lubrication
SERVICE

SOCONY-VACUUM OIL CO., INC. and Affiliates:
Magnolia Petroleum Co., General Petroleum Corp. of Calif.

*C-DATES

ET CONTRACTORS' SERVICE!



* Contract Dates

THIS SERVICE is designed to save time for you—out on the job, in the maintenance department—all through your operation!

Here are a few of the advantages Socony-Vacuum experience and resources bring you!

Our complete line of top-flight products means you get exactly the right oil or grease for every application—more efficient protection without special orders, extra bookkeeping.

We have the facilities to bring you scheduled deliveries *right on the job*. This reduces interruptions—and inventory problems.

The Socony-Vacuum Representative is always ready to work with your men—to explain where, when and how each machine should be lubricated—

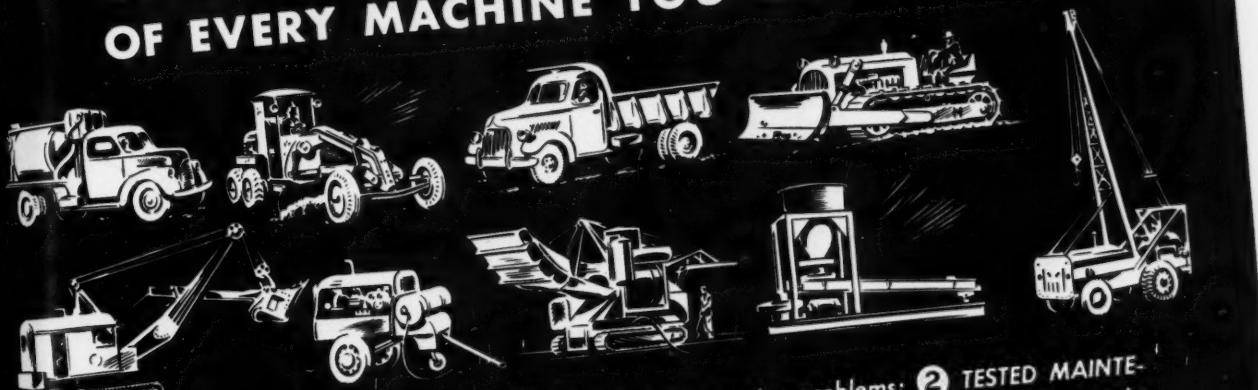
to supply tested, time-saving maintenance ideas and schedules—to help plan special schedules to fit your specific needs. And he can, when necessary, call in Socony-Vacuum engineers to help with "problem" equipment.

When you buy from Socony-Vacuum, you get not merely fuels and lubricants—but *complete on-the-job service!* Call in our representative today.

"ON YOUR STAFF—BUT
NOT ON YOUR PAYROLL"—
Your Socony-Vacuum Representative



**CORRECT LUBRICATION FOR EVERY PART
OF EVERY MACHINE YOU OPERATE . . .**



PLUS

- ① ENGINEERING HELP on time-losing operating problems;
- ② TESTED MAINTENANCE SCHEDULES that minimize service man-hours—keep equipment on the job;
- ③ PROMPT, DEPENDABLE DELIVERY—a reliable, on-the-job service that eliminates inventory problems for you!



2 Reasons why

RED LEAD

means Extra Rust Protection ...

Why is Red Lead so widely accepted throughout industry as *The* metal protective paint?

Why are paints containing Red Lead so generally specified for safeguarding metal surfaces from the costly ravages of rust?

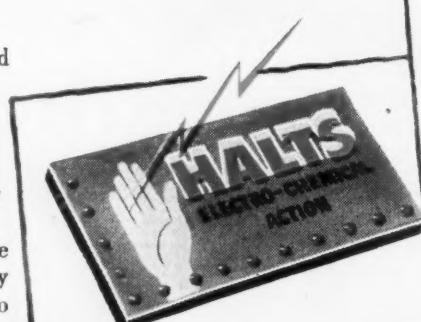
The reasons are many, but none are more noteworthy than Red Lead's ability to counteract acid conditions and to halt electrochemical action—both prime causes of rusting—as explained at right.

Still another important advantage of Red Lead is that it partially combines with the usual vehicles to form compounds generally known as "lead soaps." Due to their composition and the individual way in which these compounds form, the film obtained is highly water-resistant. In addition, lead soaps contribute to the formation of tough, elastic films that "stick on the job."

Remember, too, that Red Lead is compatible with practically all vehicles commonly used in metal protective paints, including phenolic and alkyd resin types.

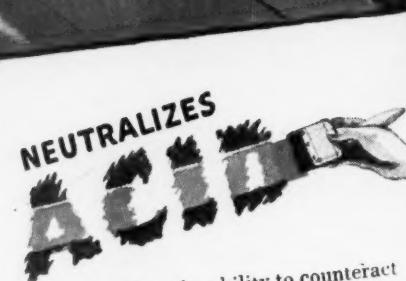
Specify Red Lead for ALL Metal Paints

The value of Red Lead as a rust preventive is most fully realized in a metal paint where it is the only pigment used.



2 Another outstanding reason Red Lead means *extra* rust protection is the unique way it shields metal surfaces with a protective film. Rusting is fundamentally an electrochemical process in which weak currents are generated which cause iron to become soluble in the lowest state of oxidation. Red Lead has properties through which this iron is rapidly converted to a stable compound that forms an adherent film. The formation of this protective shield halts electrochemical action, thus preventing further corrosion.

However its rust-resistant properties are so pronounced that it also improves any multiple pigment paint. No matter what price you pay, you'll get a better metal paint if it contains Red Lead.



1 Red Lead has the ability to counteract acid conditions which are recognized as accelerators of rust. Structural steel is exposed to such environments because acid forming compounds are carried by the atmosphere in the form of gas, smoke and moisture. Red Lead has a neutralizing effect on these conditions as it is essentially a basic pigment with the ability to develop and maintain, for a prolonged time, a mild alkaline environment at the surface of the metal. Authoritative tests show that, as a result, Red Lead inhibits the process of corrosion. In short, metal paints, too, should "stay on the alkaline side."

Write for New Booklet

"*Red Lead in Corrosion Resistant Paints*" is an up-to-date, authoritative guide for those responsible for specifying and formulating paint for structural iron and steel. It describes in detail the scientific reasons why Red Lead gives superior metal protection. It also includes typical specification formulas. If you haven't received your copy, address nearest branch listed below.

* * *

The benefit of our extensive experience with metal paints for both underwater and atmospheric use is available through our technical staff.

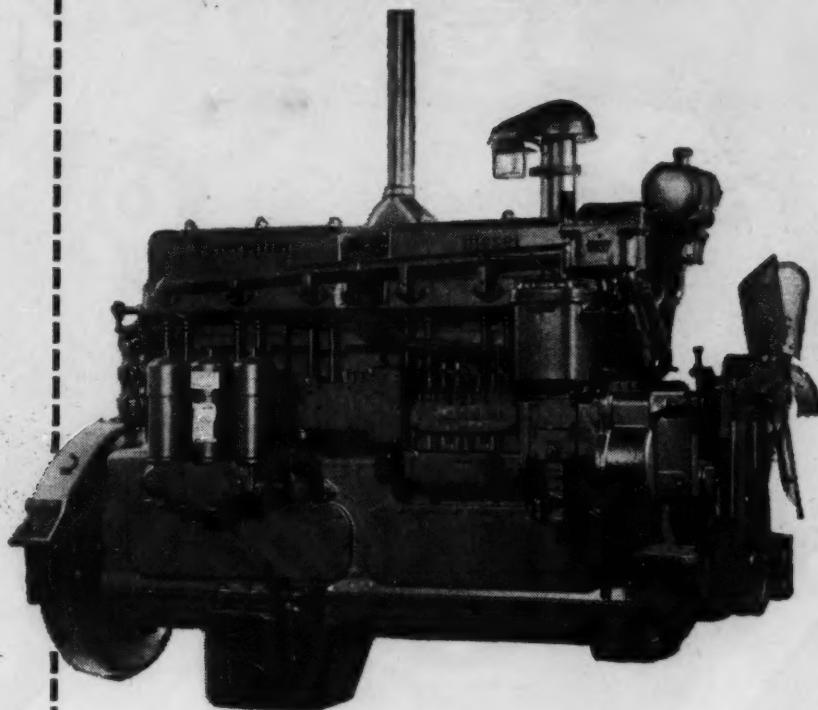


NATIONAL LEAD COMPANY: New York 6, Buffalo 3, Chicago 10, Cincinnati 3, Cleveland 13, St. Louis 1, San Francisco 10, Boston 6 (National-Boston Lead Co.); Pittsburgh 30 (National Lead & Oil Co. of Penna.); Philadelphia 7 (John T. Lewis & Bros. Co.)

**DUTCH BOY
RED LEAD**

**FIRST THING TO
THINK ABOUT...**

*The horsepower of "Caterpillar" Diesel Engines is ALL WORKPOWER. Ratings show sustained output of a fully equipped engine — not the momentary peak performance of a power plant stripped of fan, pumps or other necessary accessories.



**THEN THE FIRST THING
YOU CAN FORGET**

The engine—heart of the tractor, motor grader, shovel, dragline, compressor, crusher, dredge, electric set—is decidedly the first thing to consider when setting out to buy equipment for the great era of construction work that awaits the "Go" signal.

Pioneer of Diesel engines for tractors and other earthmoving equipment, "Caterpillar" Diesels have undergone more than thirteen years of grueling tests and engineering refinements. They've won their stripes for dependable service on every fighting front; and they've rolled up mighty records on thousands of construction tasks.

These simple, husky engines are strictly work engines. Correctly designed, carefully manufactured, and free from ordinary operating adjustments, they*

can virtually take care of themselves. With the "Caterpillar"-built fuel injection system, their fuel economy is one of their most-talked-of features. Maintenance costs over the years are unbelievably low—for these engines are given every possible protection against wear. They operate efficiently in frigid cold or torrid heat; in the rarefied atmosphere of high altitudes or at sea-level conditions.

Prompt and efficient "Caterpillar" inspection, repair and parts service is always near at hand. While the war has "made holes" in many distribution-and-service systems, the nation-wide "Caterpillar" service-dealer organization has remained intact...thoroughly equipped to keep all your earthmoving equipment rolling.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

CATERPILLAR DIESEL ENGINES



REG. U.S. PAT. OFF.
TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT

SMALL HYDRAULIC
SCRAPERS
Front and Rear Dump

HIGH-SPEED SCRAPERS
For Rubber-Tired Tractor
Hauling

LAND CLEARING
EQUIPMENT
of all Types

A REVIEW OF CURRENT LA

Proven Product Performance . . .
World-Wide User Acceptance . . .
33 Years of Engineering, Manufacturing and Servicing "Know-How"

LaPLANT-CHOATE
Earthmoving and Land Clearing Equipment





CABLE RIPPERS
For Loosening Hard
Ground

BULLDOZERS AND
PIVOT-DOZERS*
Hydraulic or Cable

CABLE SCRAPERS
For Track-Type Tractor
Hauling

MORE NEW
DEVELOPMENTS
BACKSTAGE

Presenting

LA PLANT-CHOATE MODELS

for the Benefit of Essential Civilian Users Who Are Interested in
Knowing What Equipment Will Be Available in 1945

Despite the heavy military demand for LaPlant-Choate equipment, there is a possibility that increasing quantities of certain models will be available next year to civilian users with WPB approval. Therefore, in order to give you as much assistance as possible in planning your 1945 equipment needs, we are presenting a review of current LaPlant-Choate models scheduled for production early in '45.

Naturally space won't permit showing you "the complete cast" here because LaPlant-Choate is build-

ing over 30 different models of earthmoving and land clearing equipment—both cable and hydraulic operated—for use with all sizes of "Caterpillar" track-type and high-speed, rubber-tired tractors. However, your LaPlant-Choate "Caterpillar" distributor, who has been selling and servicing dependable LaPlant-Choate equipment for over 20 years, will gladly give you full information. See him today! LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa.

*TRADEMARK APPLIED FOR



IN THE SPOTLIGHT



- ON HIGHWAY MAINTENANCE

MEET the Athey Force-Feed Loader—the machine that's taking the spotlight on urgent wartime highway maintenance. With manpower shortages seriously hampering highway maintenance, it's little wonder that this time-saving, high production loading tool has been so quickly accepted. Owned by the Highway Department, Multnomah County, Oregon, the Force-Feed Loader shown above is working on an old oil mix road.

The surfacing material is windrowed with a Motor Grader and is quickly loaded into trucks with this versatile loader.

The salvaged oil mix material is then used in the

construction of the sub-grade for a vital highway leading to the Portland Airport.

Compare its speedy loading with other loading methods!

Average loading time on this job for each 2½ yard truck was 43 seconds. Because of the Athey Force-Feed Loader, manpower, materials and taxpayer's dollars are conserved during a time when utmost conservation is essential.

For further information on Athey Force-Feed Loaders, write to your Athey—"Caterpillar" Dealer, or direct to the Athey Truss Wheel Co., 5631 West 65th Street, Chicago 38, Illinois.

Cleaning ditches and loading windrows of excess earth in Contra Costa County, California with Athey Force-Feed Loader and "Caterpillar" Motor Grader.



athey
FORCE-FEED LOADERS



*"If it's a Westinghouse A-C Welder
you can count on it...because it has
60 YEARS OF EXPERIENCE
BUILT INTO IT!"*

*"How do you figure that, Joe? A-c welders haven't been
built that long."*

*"No, but transformers have—and Westinghouse is the
outfit that built 'em first and built 'em longest. And any
a-c welder is first and foremost a transformer!"*

★ ★ ★

Joe is right. When it comes to a-c welding equipment, Westinghouse welders offer the assurance of years of proved design. Westinghouse transformer-type a-c welders incorporate the experience and know-how of 60 years of transformer designing and development . . . experience which began with the first commercial transformers ever built.

And now, with new Westinghouse developments in a-c electrodes and techniques, the benefits of a-c welding have become more widely applicable than ever before.

That's why the combination of Westinghouse a-c welders and electrodes is a top choice for industrial work of all types, from maintenance to heaviest continuous production.

Before you buy, investigate. Westinghouse a-c welders are available in 100, 200, 300, 400 and 500-ampere capacities, and in 750, 1000 and 2000-ampere models for use with the automatic Unionmelt process. Write for Catalog B-3136. Westinghouse Electric & Mfg. Co., Box 868, Pittsburgh, Pa. J-21314

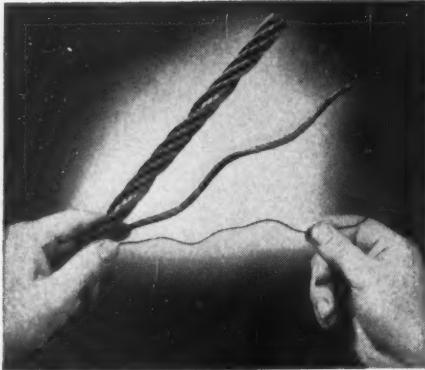


Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

A - C W E L D E R S
A N D E L E C T R O D E S

"Here are 6 reasons why I like Macwhyte PERFormed Wire Rope!"



HERE'S HOW Macwhyte PERFormed Wire Rope is made. Notice that the wires have a spiral shape. They have been PERFormed. When the rope is made, both wires and strands fit naturally into position with a minimum of internal stress and friction.

Keep asking for **MACWHYTE PERFormed!**

The demands of our armed services are so great now, there may be times when we cannot give you our usual prompt service and delivery. The situation changes from day to day, so please keep trying. We'll serve you if we possibly can.



"For maximum wire rope satisfaction and service, give me Macwhyte PERFormed every time."
"Here's why!"



● "FIRST, Macwhyte PERFormed lasts longer.

I've found that it outwears non-PERFormed ropes by a big margin. That's because internal friction and fatigue are virtually eliminated. In Macwhyte PERFormed, each wire and strand are shaped to lie *naturally* in the rope."

● "SECOND, it's more economical.

Because of the extra-long service Macwhyte PERFormed gives, I get lower cost per load carried. My records show it actually saves me money!"

● "THIRD, it means fewer shut-downs.

That's mighty important to me, because I need every man-hour possible to maintain production schedules."

● "FOURTH, it's easy to install.

Macwhyte PERFormed does not kink during unreeling. It is extremely flexible and can be put on equipment *fast*, thus saving precious time."

● "FIFTH, it is safer to handle.

Macwhyte PERFormed can be cut without seizing. Broken wires stay in place; do not wicker out to injure workmen's hands."

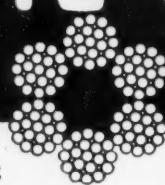
● "SIXTH, Macwhyte PERFormed has Internal Lubrication:

Heavy lubricant improves the sliding action of wires as they move in bending around sheaves and drums. In many cases the inside wires are in good condition after the outside wires are seriously worn."

MACWHYTE COMPANY



Wire Rope



Manufacturers

2941 FOURTEENTH AVENUE

KENOSHA, WISCONSIN

NO. 780

Mill Depots: New York • Pittsburgh • Chicago • Fort Worth • Portland • Seattle • San Francisco. Distributors throughout the U.S.A.

MACWHYTE PERFormed and MONARCH WHYTE STRAND Wire Rope MACWHYTE Braided Wire Rope Slings
Internally Lubricated Wire Rope MACWHYTE Special Traction Elevator Rope MACWHYTE Aircraft Cables and Tie-Rods
MACWHYTE Stainless Steel Wire Rope MACWHYTE Monel Metal Wire Rope

Greater Performance... Increased Operational Life with **MERCURY** 2-cycle Air-cooled Gasoline Engines Developed Under New, Exclusive Design Improvements



Figure A — Pistons removed from engine after 2877 hours of trouble-free operation. Piston rings were free and engine operating efficiently.

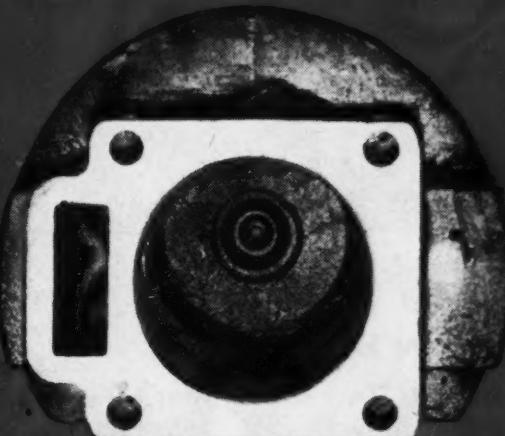


Figure B — Cylinder wall from same KB6CA Mercury Engine after 2877 hours of operation. The standard spark plug shown delivered more than 200 hours of service.

Unretouched photographs of parts removed from a standard KB6CA Mercury Engine—operating a 3000-watt AC electric generator at 3600 rpm. This engine was reassembled with the same parts and after more than 5000 hours was still operating efficiently.

Never before has it been possible for 2-cycle, air-cooled engines to operate as long, as efficiently, as relatively trouble-free as do the new Kiekhaefer-Built Mercurys.

To accommodate leaded gasoline and detergent oils, Mercury Engines include a new ignition circuit, a new magneto, and other advanced design principles which allow them to operate more than 200 hours between spark plug changes, over 2000 hours between major service inspections, and 6000 hours between overhauls.

If you have, or contemplate having, a postwar product that calls for efficient, portable power... one of the longer-lasting, more efficient Mercury 2-cycle Engines may be the solution to your problem. Write today for Brochure 404.

KIEKHAEFER CORPORATION

Builders of Gasoline Engines Exclusively

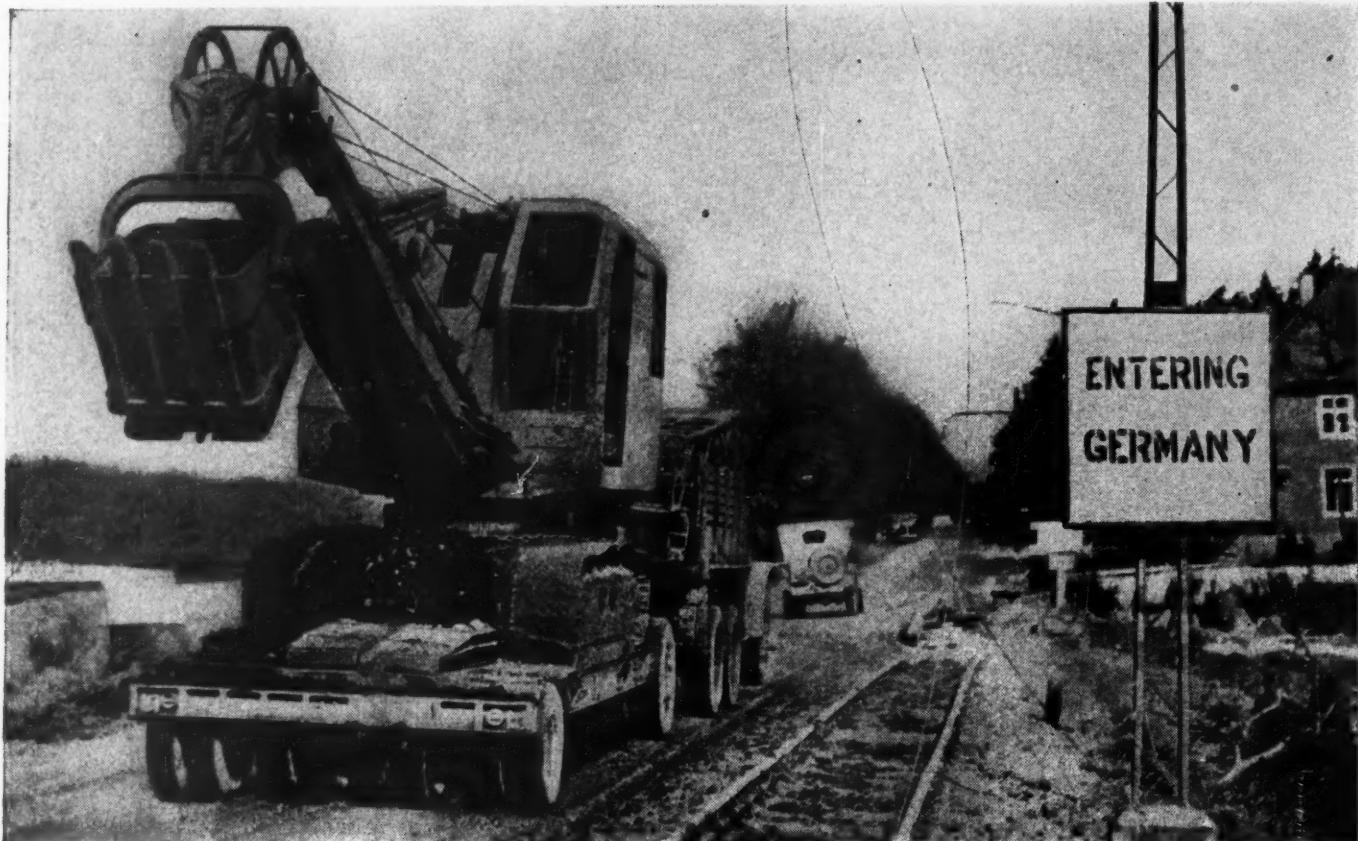
MERCURY INDUSTRIAL ENGINES



CEDARBURG • WISCONSIN

MERCURY OUTBOARD MOTORS... *Built to Use... Built to Last*

This "HIGH PRIORITY" ORDER for OSGOODS **CAN'T WAIT!**



This Fighting Osgood 20 might have been yours! But it's needed for an important job near Aachen, Germany, making it necessary to "back-order" your new equipment for a while yet. And other Osgoods that might have been yours are needed almost everywhere you might touch a map. In fact, they're needed—and being delivered—wherever dirt must be moved to wage war . . . International News Photo

Osgood has delivered over 1000 power shovels to the Army Engineers alone since Pearl Harbor. Rugged outfits for rugged service, many of them are in crucial "headline" battle actions, where a road must be built . . . an airstrip leveled . . . a beachhead landing pier finished . . . or a street cleared . . . before the issue can be settled. Under such conditions, there can be no substitute for speedy, efficient Osgood dependability—because *these jobs can't wait*.

Meantime, the Osgood you're patiently waiting for will be a better machine for the waiting—ready to deliver profit-making performance equal to the vast peacetime tasks ahead.



THE
GENERAL
EXCAVATOR COMPANY
CRANES, DRAGLINES
AND SHOVELS
DIESEL, GAS, ELECTRIC

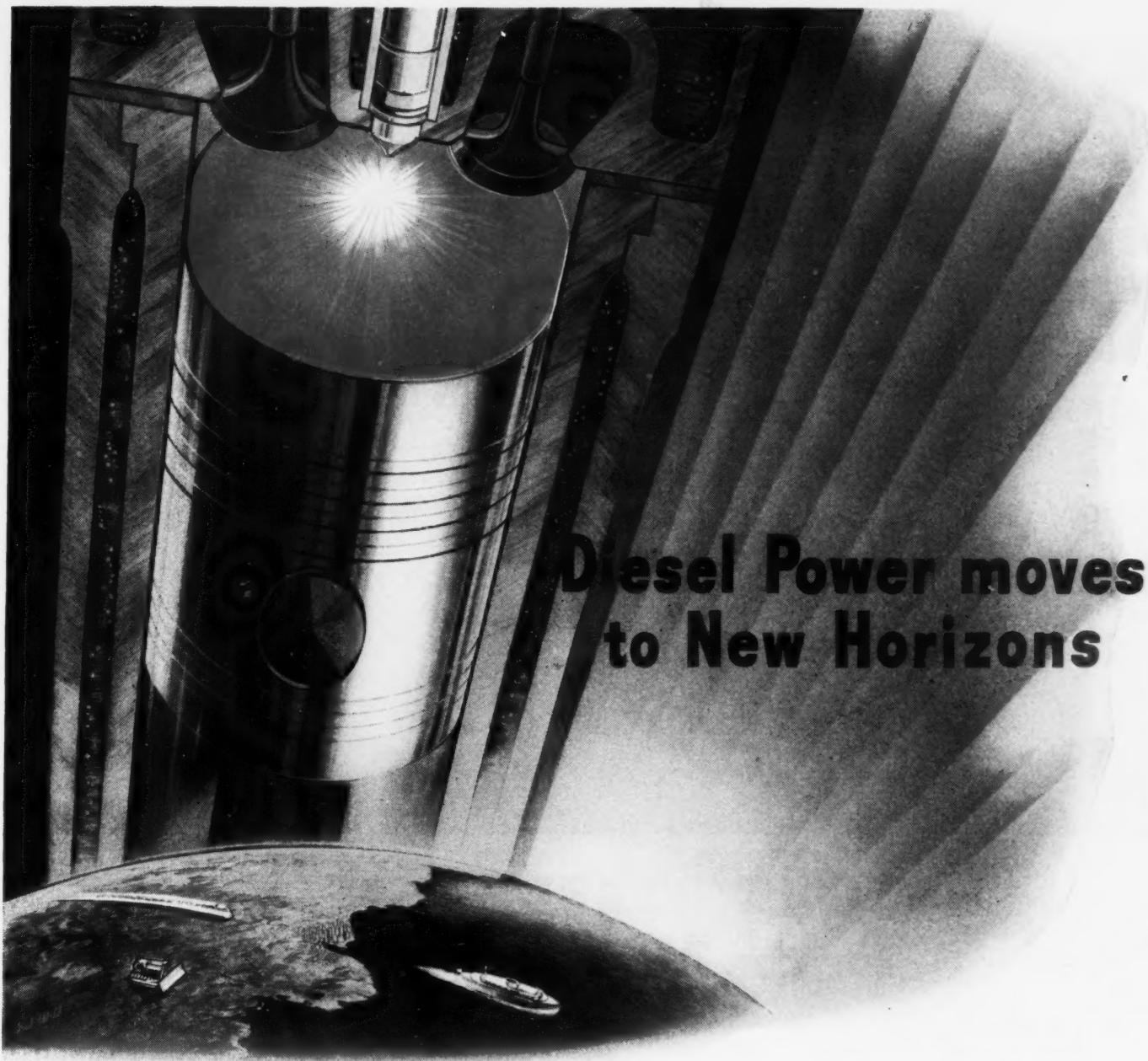
Associated with The General Excavator Company

OSGOOD

THE OSGOOD COMPANY • MARION, OHIO



OSGOOD
SHOVELS, DRAGLINES
CRANES
CRAWLER & WHEEL MOUNTS
DIESEL, OIL, GAS, ELECTRIC



Diesel Power moves to New Horizons

Tomorrow, Diesel Power will speed commerce around a shrinking globe and lift century-old burdens from the backs of millions.

For our Diesel industry has grown tremendously in the past decade. The lash of war has further stimulated its growth. Tomorrow, Diesel's inherent advantages of economy, high power-output, durability, versatility and ruggedness will be more widely available than ever in history.

America's engine builders have long since learned to come to American Bosch for the engineering skill to apply fuel injection equipment to ever-improving Diesels. Here they also find the New England craftsmanship to meet unheard of demands for precision production in quantity.

These twin skills have come to be known as "Precision Production for Power." Perhaps better than any other, that phrase describes the American Bosch of today and tomorrow.

AMERICAN BOSCH CORPORATION • Springfield 7, Mass.

AMERICAN BOSCH
PRECISION PRODUCTION FOR POWER



STOUT STEEL MUSCLES for the Merchant Marine

The rigging for a typical cargo ship requires over 11,000 feet of wire rope, ranging in size from $\frac{1}{4}$ inch to $2\frac{1}{4}$ inches, and weighing over 10 tons. Scores of shipyards are building such ships—and using plenty of tough, dependable Wickwire Rope.

Oil fields, mines, logging camps, construction crews—and our fighting men abroad—also depend upon the stout steel muscles of Wickwire Wire Rope to do their heavy hoisting and hauling jobs. That's why—even with more equipment and working at full capacity 24 hours a day—we cannot



keep up with the great demands for Wickwire Rope.

Since wire rope is harder to get, each length must be made to last longer. WISSCOLAY Preformed Wire Rope, manufactured by Wickwire Spencer, not only lasts longer, but it's kink-resistant—easier to cut, splice and install—safer to handle.

If you have a wire rope problem our wire rope engineers will be happy to be of service. Call or write our nearest branch office or Wickwire Spencer Steel Company, 500 Fifth Avenue, New York 18, N. Y.

VALUABLE GUIDE

Thousands of copies of "Know Your Ropes" have been sent to men in industry and the Services. Packed with ideas for making wire rope last

SEND FOR YOUR



FOR ALL ROPE USERS

longer this 82 page book contains 48 wire rope life-savers; 78 "right and wrong" illustrations, and 20 diagrams, tables, graphs, charts.

FREE COPY

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STEEL COMPANY**

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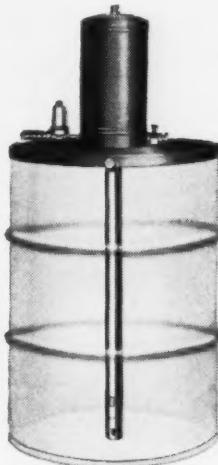
Replace Worn Out Pumps and Guns with New Alemite Equipment

Often, replacement of a worn part or two with genuine Alemite parts puts old equipment back in tip-top shape. But, pumps and guns that are beyond repairing, should be replaced with new Alemite equipment. You simply can't afford to risk faulty lubrication of almost irreplaceable construction equipment. Check over your pumps and guns, now.



ALEMITE No. 6536
Portable Volume Pump

This rugged 35-lb., capacity, manually operated pump is approved and adopted as standard equipment by leading tractor manufacturers. Because of its shape, it is easily carried around on the job by hand. Has a big opening for easy filling. It delivers light-bodied and semi-fluid greases in volume—one pound of lubricant for each 20 strokes of the lever at from 1000 to 2500 pounds pressure. Patented release relieves pressure in hose, eliminating dripping of lubricant when coupling is disengaged from fitting. Comes ready to use.



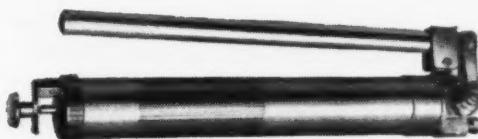
ALEMITE No. 7701-B
Heavy Duty Barrel Pump

This pump can save you time and machines because it delivers fibrous, heavy or light lubricants direct from "barrel to bearing." Under the severest conditions, the performance of this ruggedly built pump is guaranteed. The exclusive Dyna-Matic Primer permits pumping of heavy fibrous lubricants even at low temperatures. What's more, the pump has the capacity to serve many outlets at the same time. It is made in high, low and medium pressure models. Suitable for lubrication of tractor rolls, idler bearings and all pressure gun fittings.



ALEMITE No. 7710
Fast Delivery Oil Power Pump

A ruggedly built, heavy duty oil pump which pumps oil directly from 55-gal. drums. Used for rapid filling of crank cases or other housings requiring oil or fluid gear lubricants. To operate, simply connect air line to easily detachable air coupling. This pump can make big savings for you wherever a large volume of oil or fluid lubricant must be transferred quickly. It delivers 3½ gal. of S.A.E. No. 10 oil per minute using 100 lb. air pressure, developing 4½ times air pressure used. In every way, this is a fast, accurate dependable pump.



ALEMITE No. 6679
High Pressure Volume Delivery Gun

Here is a really heavy-duty gun that can take abuse and still do a dependable lubrication job. Has 21-oz. capacity and will handle fibrous, heavy and light-bodied greases. The gun develops up to 5000 pounds pressure per sq. in. It is easily and quickly filled through a loader valve or by removing the cylinder head. It is spring primed. The extra long handle gives maximum leverage and operating ease. Used with hose or adaptors for lubricating all kinds of pressure fittings.

Ask your jobber or write for complete details, today



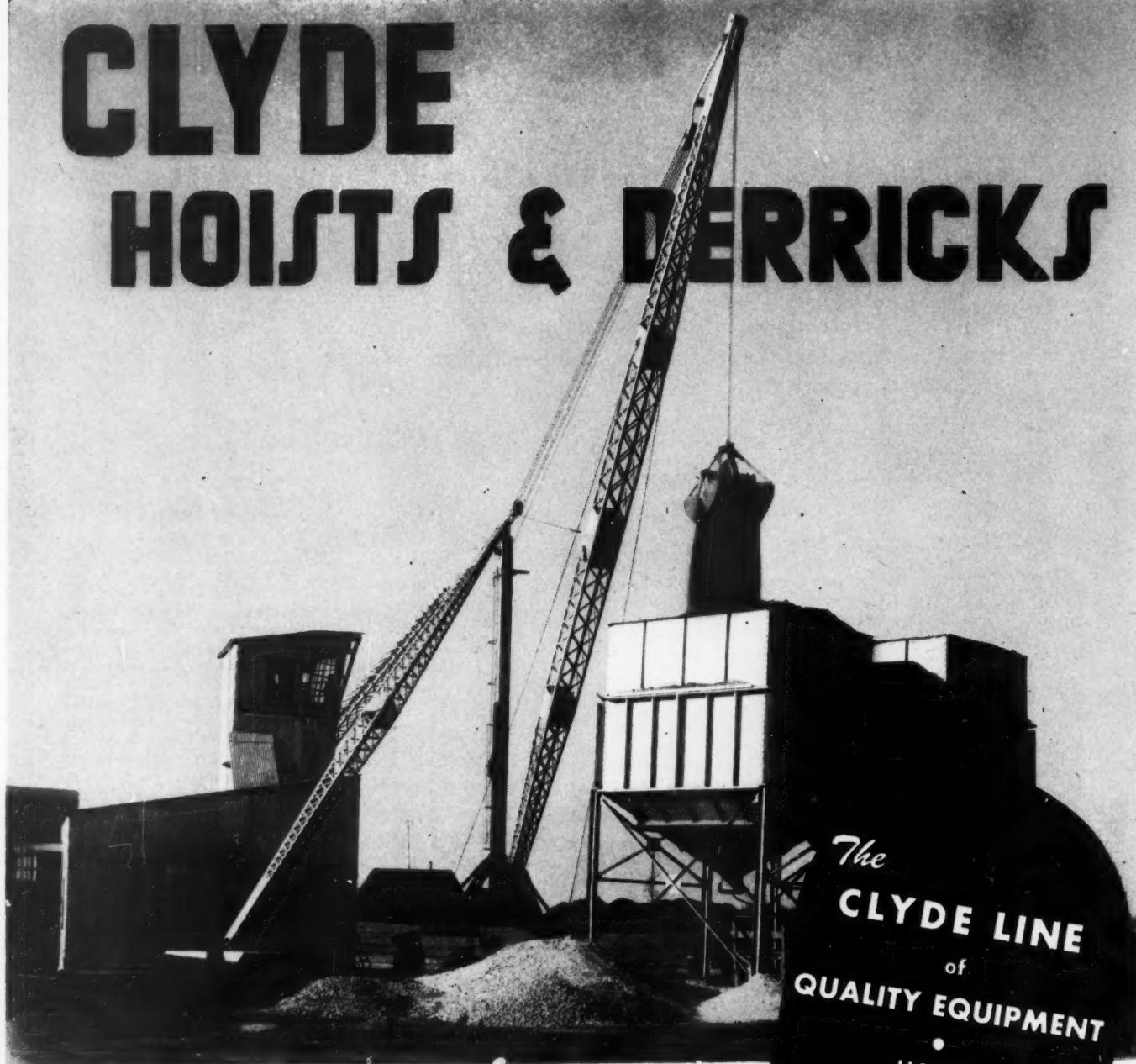
ALEMITE

First in Modern Lubrication

1840 Diversey Parkway, Chicago 14, Illinois
In Canada: Belleville, Ontario

EQUIPMENT • LUBRICANTS • MAINTENANCE • CONSULTATION • ENGINEERING

CLYDE HOISTS & DERRICKS



A complete line of modern equipment specially designed to meet the requirements of all types of material handling operations.

Clyde hoists and derricks are built to provide the utmost in safe, efficient and economical operation. Every part is accurately designed for the duty it is to perform to assure long and dependable service.

Bulletins giving construction details and complete information on Clyde equipment are available upon request. Write for your copies.

The
CLYDE LINE
of
QUALITY EQUIPMENT

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- HOISTS
- DERRICKS
- WHIRLEYS
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- HAND POWERS
- BUILDERS TOWERS
- MINE HOISTS
- WINDLASSES
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- PILE DRIVERS
- BARGE & DREDGE MACHINERY



CLYDE IRON WORKS, INC.
DULUTH, 1 MINNESOTA

Fast, Flexible Snap-on Wrenches cut nut-turning time - speed assembly

MEASURED in man-hours and costs, *nut turning* stands out as the most important hand operation in industry. Millions of workers spend a large part of their time at *nut turning*. And the speed and quality of their work depends on wrenches... on the efficiency and rightness-for-the-job of the wrenches they use.

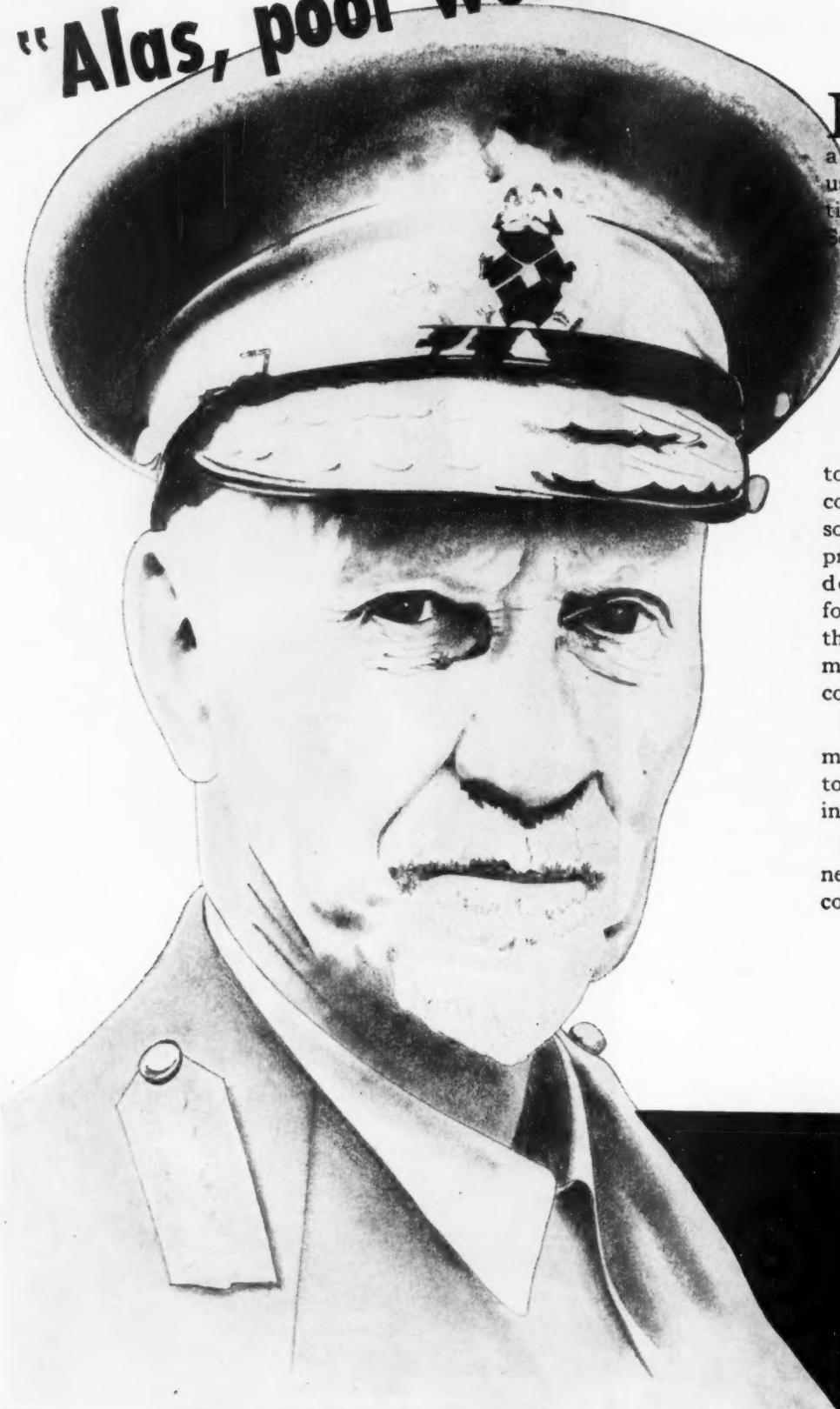
For every nut turning operation there is a Snap-on wrench engineered to do the job better, faster, easier. On hundreds of assembly lines Snap-ons are standard equipment . . . the choice of better mechanics throughout industry . . . The most advanced types of wrenches for production, assembly and maintenance are described in the Snap-on catalog . . . write for it!

SNAP-ON TOOLS CORPORATION
8084-B 28TH AVENUE • KENOSHA, WISCONSIN



then he said to himself

"Alas, poor world, I knew it well"



EXPLAINING how the old map is being rolled up and a new map is unrolling before us . . . Field Marshal Jan Christian Smuts, Prime Minister of South Africa, went on to warn:

"We are living in a world where we are FORCED to a fundamental revision of old concepts. The old world that we knew has GONE and it will NOT RETURN!"

Be thankful that to many factory men here in America that conviction has already been absorbed, because the urgency for production . . . the urgency for development . . . the urgency for redesign has made evident, throughout these critical supply months, the need for better concepts.

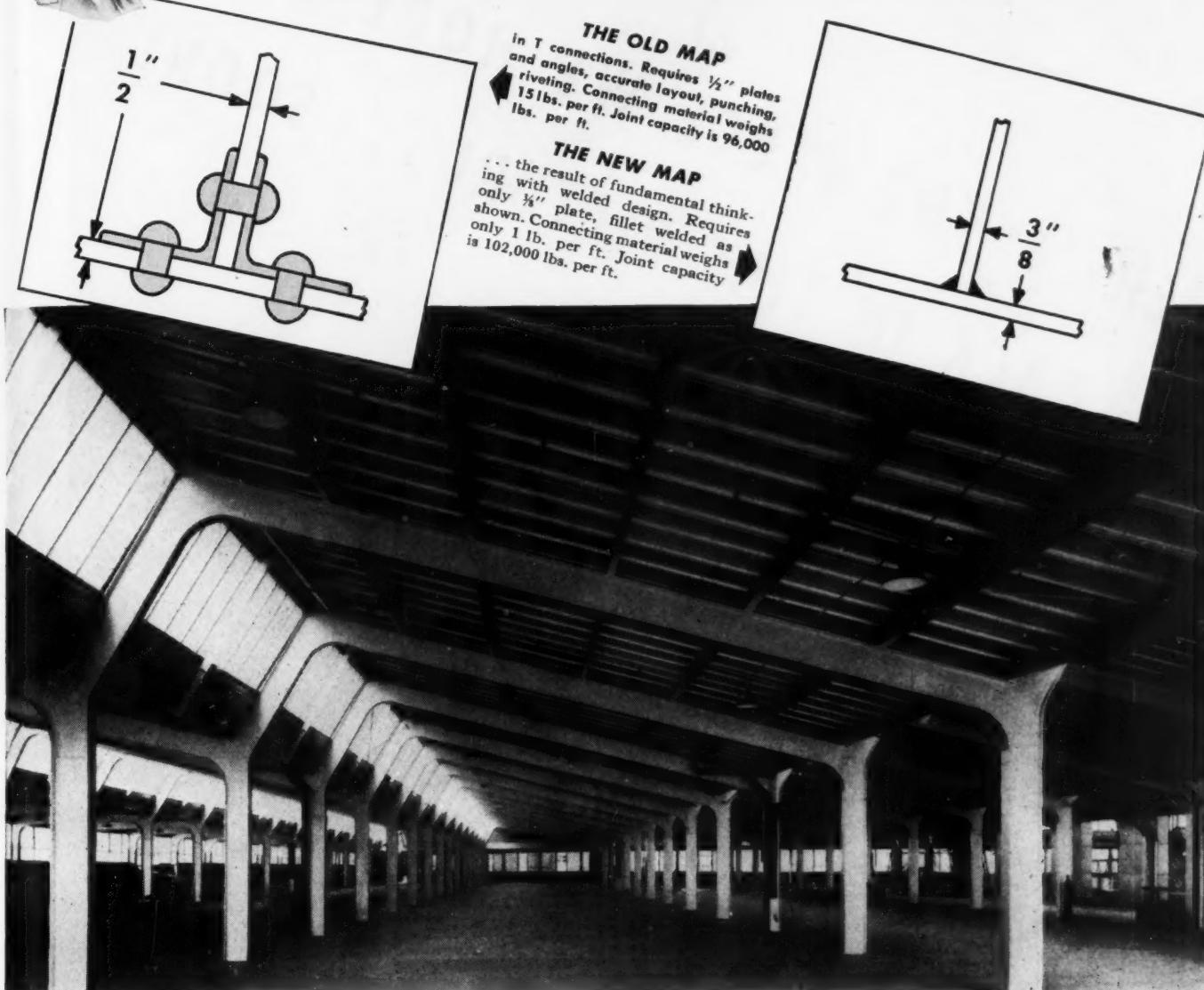
By following old concepts in manufacture, the materiel flowed too little and too late and too ineffectively.

Be thankful for the hundreds of new concepts that are now overcoming our peril. For example:



"A New Map is Unrolling," he says

LOOK, MARSHAL SMUTS, how fundamental thinking is revising old concepts in the design of building structures:



The rigid frame building shown above illustrates the improved appearance and greater utility made possible by welded design. Fabrication and erection costs were 10% less than for conventional construction.

The Lincoln Engineer nearby will gladly help you revise old concepts with Arc Welding.

THE LINCOLN ELECTRIC COMPANY, CLEVELAND 1, OHIO

America's greatest natural recourse

ARC WELDING



It's the new and improved Huber Roller, whose current performance on wartime assignments foreshadows the role it is destined to play in the nation's road building and maintenance work . . . when the war is won.

THE HUBER MFG. COMPANY • MARION, OHIO, U. S. A.

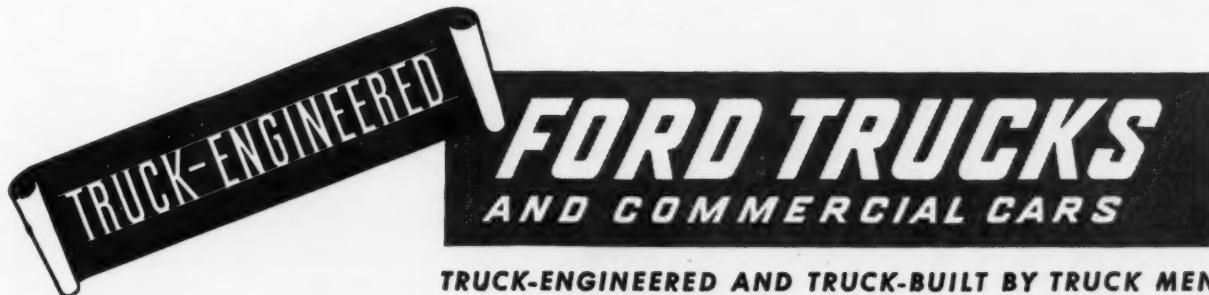
HUBER ROLLERS



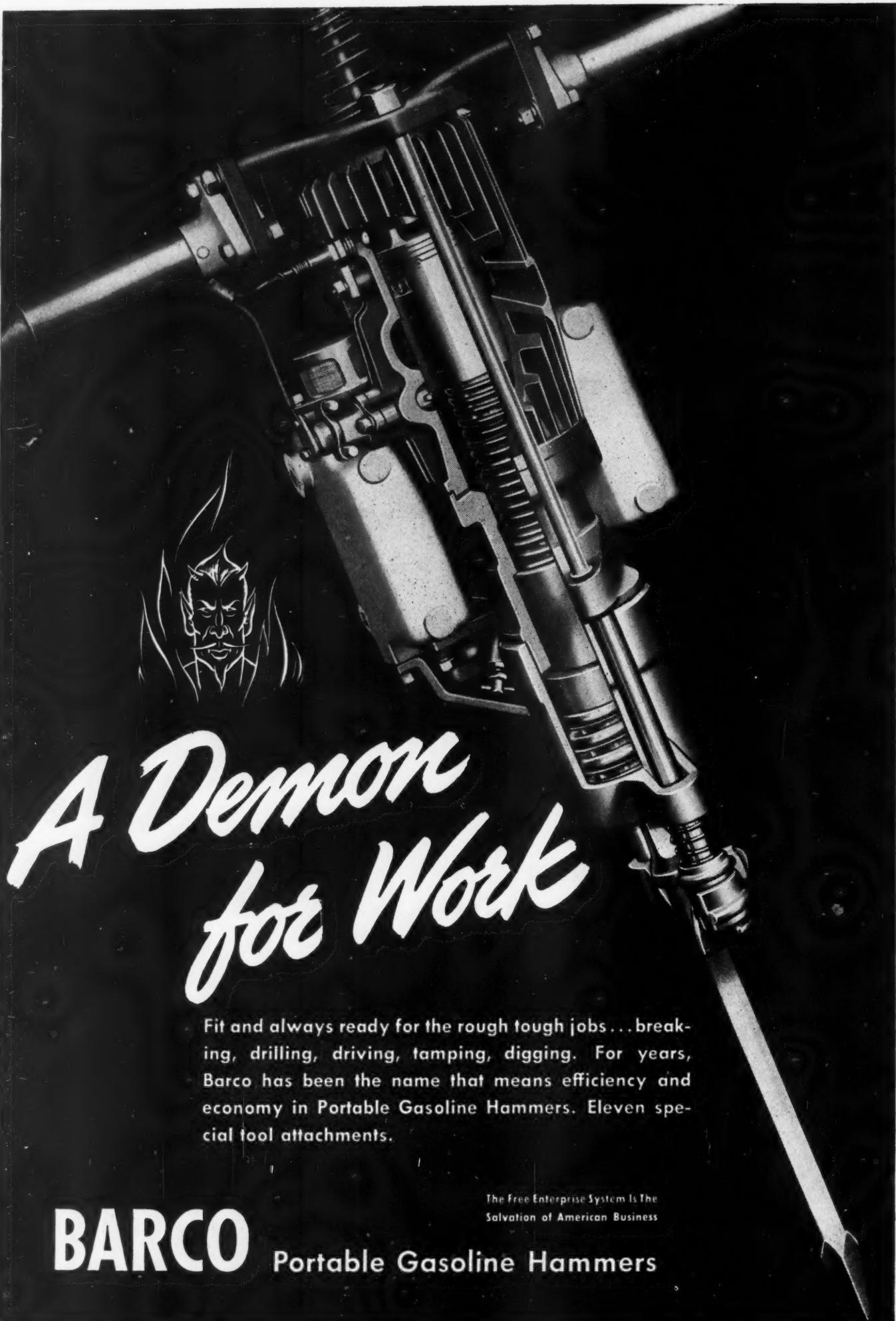
More Ford trucks on the road

On more jobs

For more good reasons !



TRUCK-ENGINEERED AND TRUCK-BUILT BY TRUCK MEN



Fit and always ready for the rough tough jobs... breaking, drilling, driving, tamping, digging. For years, Barco has been the name that means efficiency and economy in Portable Gasoline Hammers. Eleven special tool attachments.

The Free Enterprise System Is The
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This new booklet tells you how!

Write for your copy today. Find out for yourself how you can transport, elevate and place concrete in one operation . . . faster, more efficiently, at less cost . . . by pumping through pipe line.

You'll find page upon page of important questions and answers . . . pages of actual applications and results . . . mechanical data and general construction information . . . all accurately and carefully compiled to

give you the most complete information possible on PUMPCRETE . . . the pump that pumps concrete. It's the newer and better method for all types of construction jobs.

This new booklet is ready for you now. Your copy will be mailed immediately. There is no cost or obligation. Address Chain Belt Company, Construction Division, 1664 West Bruce Street, Milwaukee 4, Wisconsin.

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CONSTRUCTION MACHINERY

PUMPS PAVERS PUMPCRETES MOTO-MIXERS MIXERS

EXPLOSIVES Are Tools . . .

The Right Choice . . . Properly Handled
. . . Gets the Most From the Job



Picking an explosive is like choosing the right tool from the kit—both call for a consideration of job requirements.

Atlas makes over 120 kinds and grades of explosives, many of them in different sizes and types of packing.

From them, you will find the right grade to fit your requirements for Strength . . . Velocity . . . Heaving Power . . . Water Resistance . . . Fume Qualities . . . Permissibility.

You'll find the right tool for more profitable blasting in the Atlas kit of explosives.

ATLAS HIGH EXPLOSIVES

HIGH DENSITY			FREE FLOWING	
AMMONIA DYNAMITES		APEX	FLO-DYNS	Quarry Specials
EXTRAS	Str. 15%-60% Vel. 7300-12,000 Den. 105	Str. 20%-70% Vel. 9000-19,000 Den. 115	Str. 10%-65% Vel. 4600-5400 Bag Packed	Str. 20%-65% Vel. 4000-5500 Bag Packed
AMODYNDS	Str. 65% Vel. 5800-10,000 Den. 118-173	Stumping Expl. Str. 30%-65% Vel. 7400-9000 Den. 133-165	APCODYNS	COALITES
LOW DENSITY			Str. 65% Vel. 7000-9000 Den. 128-180	Str. 55%-60% Vel. 6000-10,000 Den. 133-244
NITROGLYCERINE DYNAMITES			Nitroglycerine Dyn. Str. 20%-60% Vel. 8800-19,000 Den. 105	APCOLS
FARMEX Ditch.	Str. 50% Vel. 18,000 Den. 103-108	GEL-COALITES	Str. 30%-90% Vel. 7000-20,000 Den. 85-100	Str. 60% Vel. 4500-7000 Den. 133-178
GELATINS			PETROGEL	AMMONIA
ATLAS	Str. 20%-100% Vel. 6500-20,000 Den. 85-100	Blasting Gel.	Str. 60% Vel. 18,000 Large Cartridges	Giant
SEMI-GELATINS			Str. 100% Vel. 20,000 Large Cartridges	Str. 30%-90% Vel. 7000-20,000 Den. 85-100
GEL-COALITES	Str. 55%-60% Vel. 5900-12,000 Den. 120	GELODYNDS	Oil Well Expl.	PETROGEL H. V.
PERMISSIBLE			Str. 80%-100% Vel. 20,000 Large Cartridges	Str. 60%-100% Vel. 18,000-20,000 Large Cartridges
AMMONIA			Str. % Strength. Vel. Velocity of detonation, feet per second, in the open 1 1/4" x 8". Den. Minimum number 1 1/4" x 8" cartridges per 50-lb. case.	
NITROGLYCERINE				

• There is profit in the right explosive •



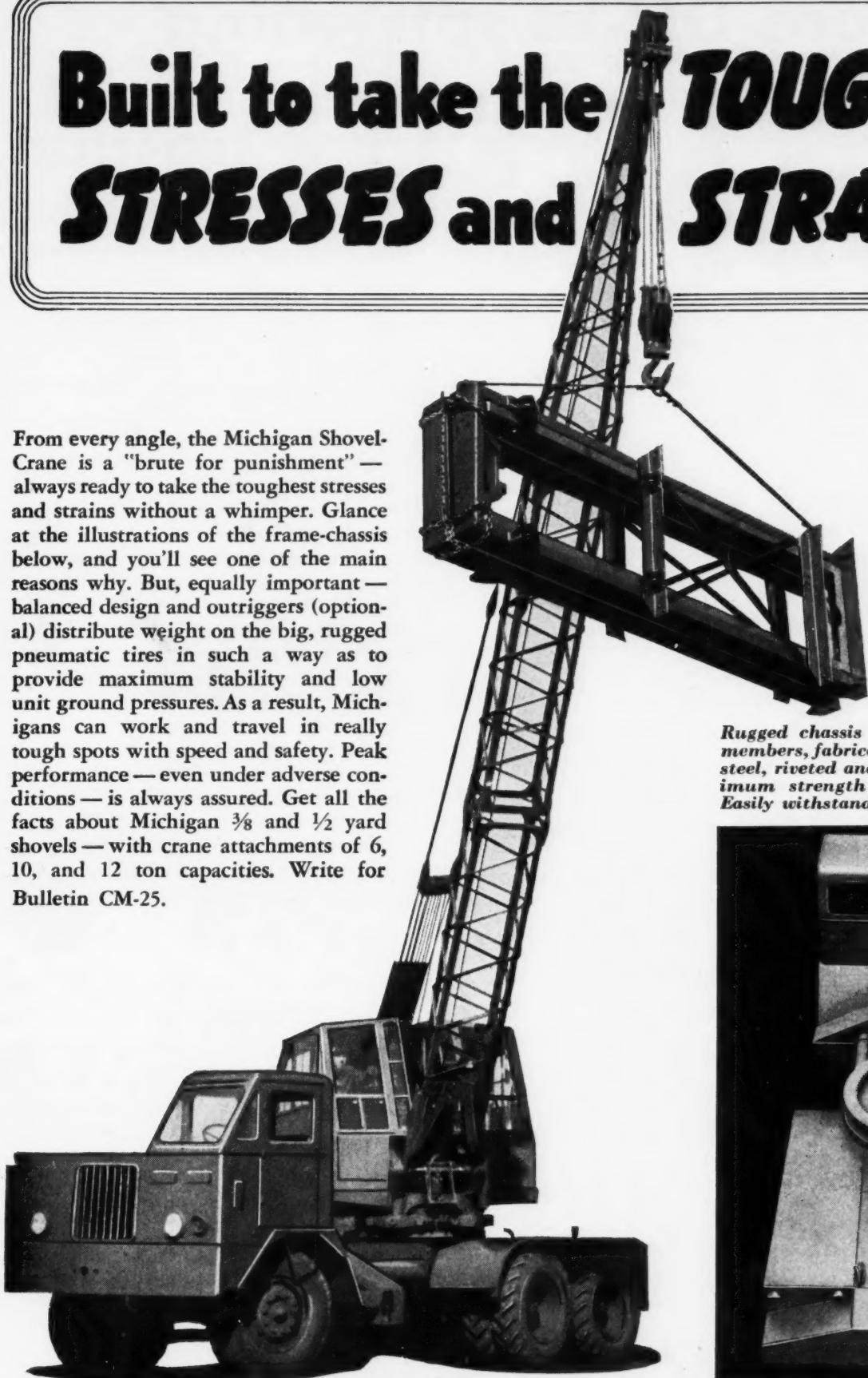
ATLAS

POWDER COMPANY
WILMINGTON 99, DELAWARE
Offices in Principal Cities

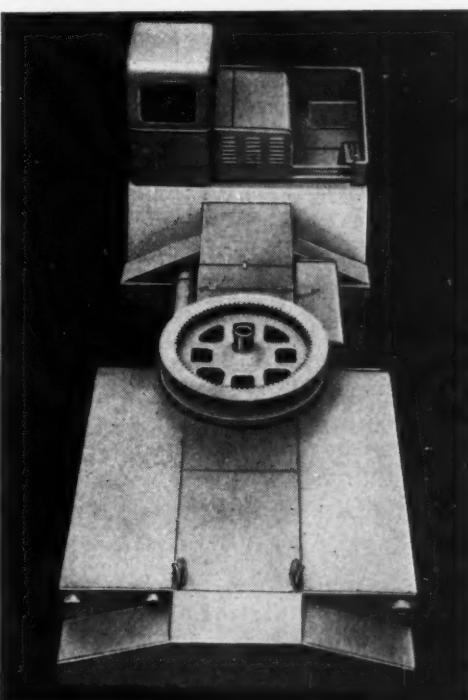
Industrial Explosives • Industrial Finishes • Coated Fabrics • Acids
Activated Carbons • Industrial Chemicals • Ordnance Materiel

Built to take the **TOUGHEST** **STRESSES** and **STRAINS**

From every angle, the Michigan Shovel-Crane is a "brute for punishment"—always ready to take the toughest stresses and strains without a whimper. Glance at the illustrations of the frame-chassis below, and you'll see one of the main reasons why. But, equally important—balanced design and outriggers (optional) distribute weight on the big, rugged pneumatic tires in such a way as to provide maximum stability and low unit ground pressures. As a result, Michigans can work and travel in really tough spots with speed and safety. Peak performance—even under adverse conditions—is always assured. Get all the facts about Michigan $\frac{3}{8}$ and $\frac{1}{2}$ yard shovels—with crane attachments of 6, 10, and 12 ton capacities. Write for Bulletin CM-25.



Rugged chassis and frame of box type members, fabricated of high-tensile alloy steel, riveted and welded to provide maximum strength and minimum weight. Easily withstands stresses and strains.



MICHIGAN
POWER SHOVEL COMPANY
BENTON HARBOR, MICHIGAN

More GO in soft going with O-P-E-N C-E-N-T-E-R traction



Le Tourneau Model C Tournapull and
Carryall Scraper on Goodyear Sure-Grips

BEST way to move today's bigger earth yard-ages faster is with tires that won't clog up and spin helplessly under peak loads.

That's why more and more contractors now buy Goodyear Sure-Grips for their power units. They know these really tough tires with that famous *open center* self-cleaning tread keep their sharp,

THE RIGHT TIRE FOR EVERY JOB *Rayotwist-armored for extra strength*

clean bite because they have no holding pockets, no mud traps to gum up.

The wide, unblocked channels you see here actually sluice out dirt, mud and stones and leave the massive, heavy-duty lug bars free and clear to bite deep and pull better in any going!

Now superarmored with Goodyear's patented Rayotwist cord—*the strongest body we've ever used in a work tire*—these great giants are by far the finest off-the-road tires that can be built from today's synthetic and permissible natural rubber.

The men who use them find these big fellows the longest-lasting, hardest-working tires made today. You will, too, once you work with Goodyear.

Sure-Grip, Rayotwist, All-Weather—T.M.'s
The Goodyear Tire & Rubber Company



GOOD YEAR

THE GREATEST NAME IN RUBBER

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

Construction Methods

ROBERT K. TOMLIN, Editor

Volume 27

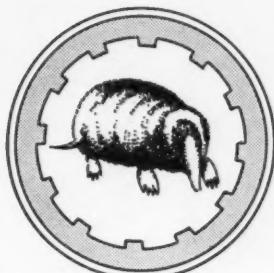
FEBRUARY, 1945

Number 2



FRANCIS T. CROWE, builder of great dams, is winner of Moles' non-member construction award.

Crowe and McMenimen RECEIVE MOLES CONSTRUCTION AWARDS



Chicago, Joliet, Fort Hueneme, Oakland, Alameda, Seattle and Tacoma.

IN RECOGNITION of their outstanding contributions to construction progress, Francis T. Crowe, constructor of Boulder and Shasta Dams, and William V. McMenimen, builder of Pacific naval bases, received the 1945 Achievement Awards of The Moles, New York organization of tunnel and heavy construction men. Given annually to a non-member and a member of The Moles, the awards were presented at a dinner at the Hotel Roosevelt Feb. 7. Selection of the award winners was made by a committee headed by Edmund A. Prentis, of Spencer, White & Prentis, Inc., who received the member award in 1942. Mr. Prentis presided at the dinner.

Selected for the member award in acknowledgment of the executive and construction skill with which he has aided in development of naval air bases throughout the Pacific, Mr. McMenimen is chairman of the Executive Board of the group of eight contractors responsible for the huge undertaking known as Pacific Naval Air Base Contractors. Its construction has, up to the present time, exceeded \$1,125,000,000. The PNABC group has built bases at Guam, Wake, Midway, the Hawaiian Islands and other secret locations together with the operation of huge procurement bases covering

Mr. McMenimen began his career as general superintendent on construction of the McAdoo tubes under the Hudson River between New York and New Jersey for the Hudson and Manhattan Railroad. As vice-president and general manager of the Raymond Concrete Pile Co., he has, since 1918, had direct supervision over construction aggregating more than \$246,774,511, including difficult foundations, borings, drydocks, hydroelectric developments, marine shipways, tunnels and flood conservation. Among his major peacetime undertakings were the Lake Pontchartrain and San Mateo bridges and the piers for the San Francisco-Oakland Bridge.

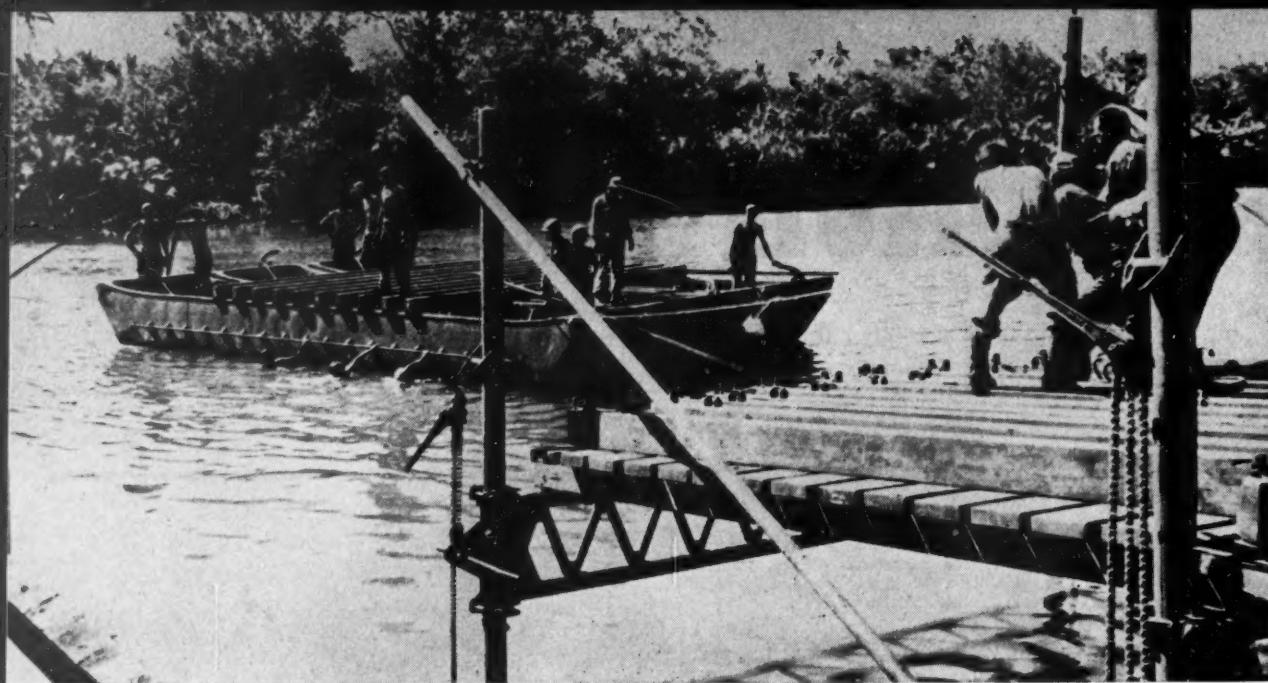
To Frank Crowe, non-member award winner, belongs credit for construction of such great dams as Guernsey, Deadwood River, Boulder, Copper Basin, Gene Wash, Parker, and Shasta. Of him it has been written, "To the extent that it can



WILLIAM V. McMENIMEN, vice-president, Raymond Concrete Pile Co., receives member award.

be said to belong to any single man, Boulder was Frank Crowe's triumph." As general superintendent for Six Companies Inc., he completed Boulder, the world's highest (726 ft.) dam, in five years—two years and two months ahead of schedule. After Boulder came Parker, the deepest concrete dam ever built, with foundations extending 250 ft. below river bed. In 1939 he became general superintendent for Pacific Constructors, Inc., on the 602-ft. high Shasta Dam, second highest concrete dam ever built. The unique concrete pouring system for this dam involved a 460-ft. high headtower from which seven cableways led to the tailtowers.

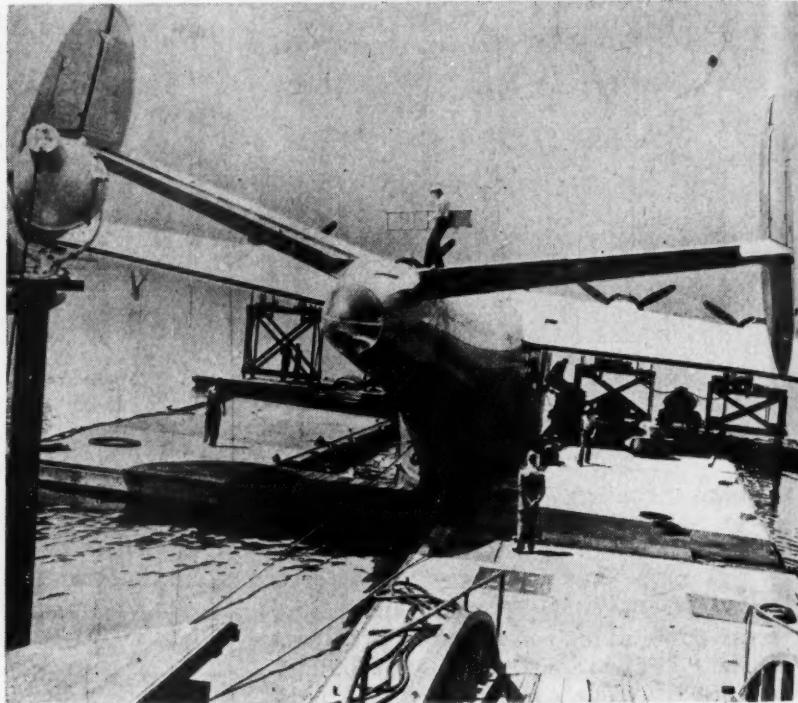
Mr. Crowe began his engineering career with the U. S. Bureau of Reclamation for which he worked on several noted dams, including Jackson Lake, Arrowrock and McDonald Lake. As first assistant to the superintendent of construction on Arrowrock, which was for 20 years the world's highest dam, he designed a comprehensive concrete conveying and distributing system, as well as a then unique pipe system for the pneumatic transportation of cement. Early in 1944 he was elected to honorary membership in the American Society of Civil Engineers.



LEYTE ISLAND BRIDGE (left), demolished by Japs, is replaced section by section while pontoons are floated into position guided by U. S. Army Engineers swimming alongside.

U-SHAPED SEAPLANE DOCK (below) provides berth for Martin Mars, huge flying boat, at Alameda, Calif., Naval Air Station. Basic structure consists of standard Navy pontoons over which 3-in. wire mesh concrete deck was laid after covering joints between pontoons with tar construction paper.

THIS MONTH'S NEWS REEL



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LAST BUCKET OF CONCRETE on 602-ft. high Shasta Dam (below), world's second highest and largest, is poured Dec. 22. Final pouring in roadway deck which will carry highway across crest of structure brings to 6,535,000 the number of yards of concrete in project. Standing below bucket are RALPH LOWRY (left), construction engineer, U. S. Bureau of Reclamation, and FRANK CROWE, general superintendent for Pacific Constructors, Inc., who have been on Shasta job since its beginning in July, 1940. Back of dam (shown in photo) is impounded more than 1,283,000 acre-ft. of water, which is greatest amount contained in Shasta Lake since storage began on Jan. 1, 1944.



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SIX-INCH PIPE is welded by American soldiers working on new petroleum pipeline from Burma to China. Long-handled Walworth wrench turns pipe.



ROAD OF 105-MM. SHELL CASES is built by South African troops in Italy to carry their 40-mm. Bofors into position.



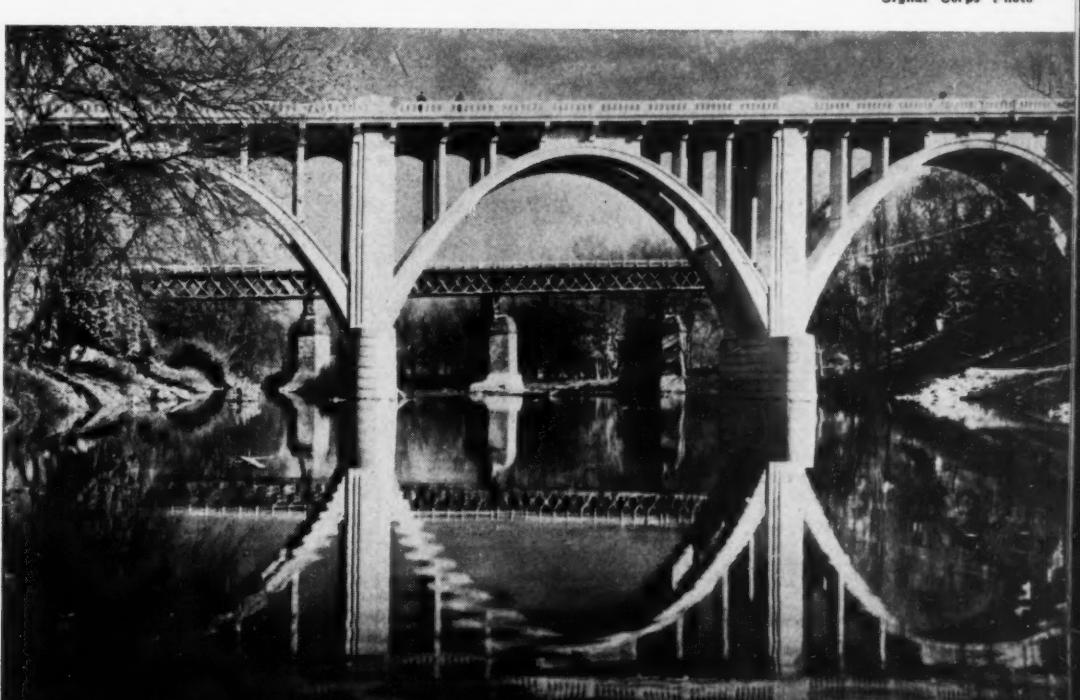
FIRST AMERICAN AIRFIELD in France is graded by Engineers of 9th Tactical Air Command operating Caterpillar tractors with LeTourneau scrapers.
Air Forces Photo

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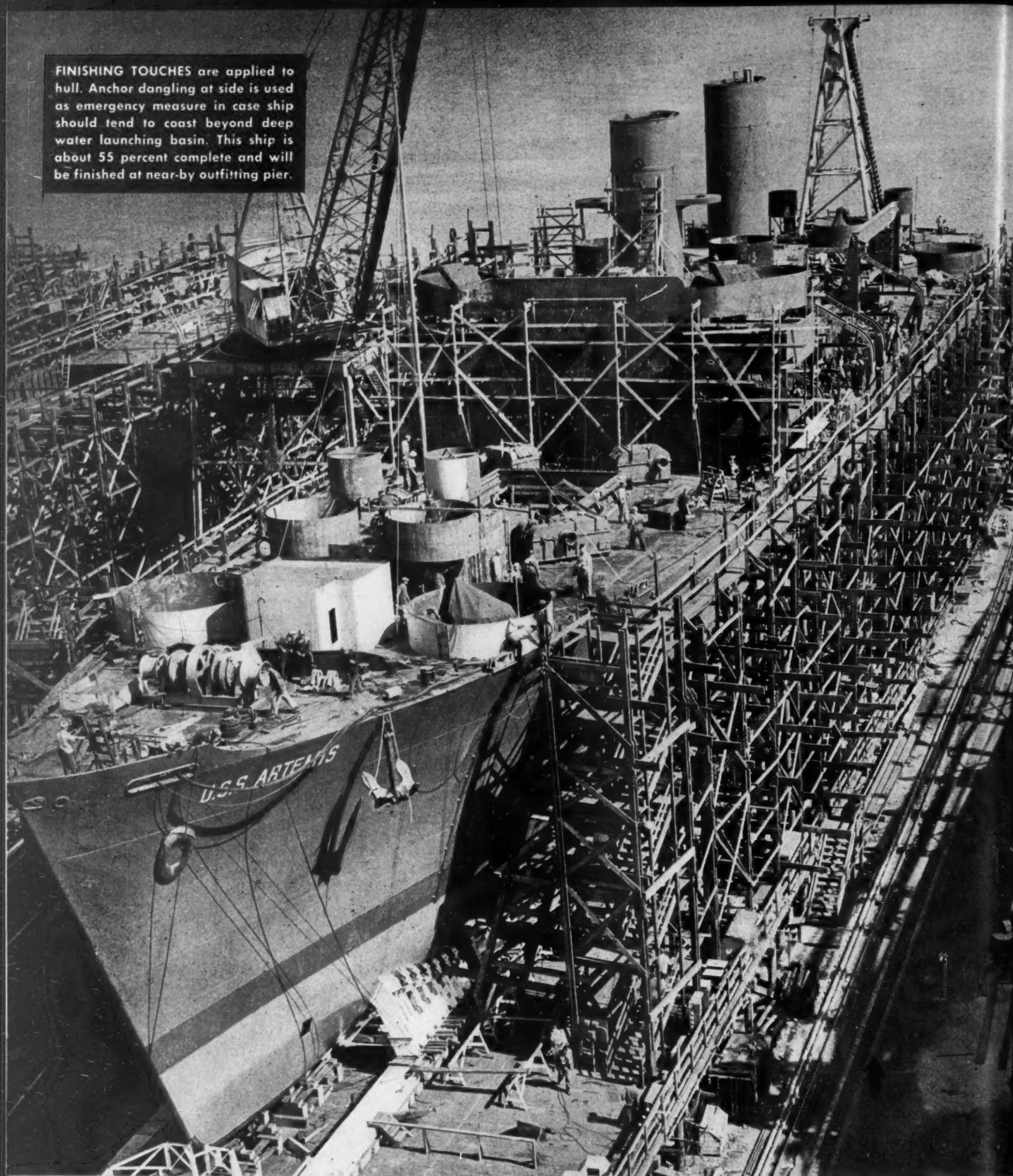
PREFABRICATED BRIDGE (below) is built by Indian sappers (engineers) in Arakan. Parts of this new type of ponton bridge can be transported by jeep and assembled in short time.
British Comine Photo



NEW JUG BRIDGE over Monocacy River near Frederick, Md. (below), replaces temporary structure (in background) built on piers of original Jug Bridge, which was washed away by flood 2 yr. ago. Bridge received name from empty whiskey demijohn buried by workmen in near-by concrete block.
Signal Corps Photo



FINISHING TOUCHES are applied to hull. Anchor dangling at side is used as emergency measure in case ship should tend to coast beyond deep water launching basin. This ship is about 55 percent complete and will be finished at near-by outfitting pier.



COMBAT

Cargo Ships

Built in Forty Major All-Welded Steel Sections by Pre-Assembly Methods Involving Repetitive Operations

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February

By ROBERT L. ANDRESEN

Manager, Progress Dept., Walsh-Kaiser Co., Inc.
Providence, R. I.

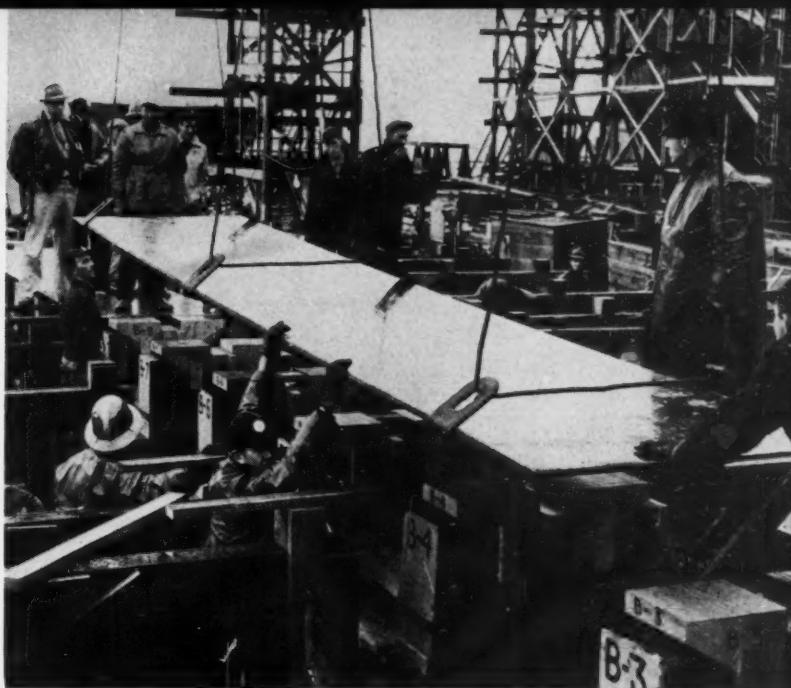
ONE OF THE MARVELS of this war has been the ability of American shipbuilders to turn out great numbers of large, sturdy, ocean-going ships of all types. Even more surprising has been the ability of organizations never before associated with the art of shipbuilding to step in and achieve some of the outstanding ship construction records of all time, an almost miraculous job considering the fact that most of the workers were new and inexperienced.

Walsh-Kaiser, a U. S. Maritime Commission shipyard, is now building its third different type of ship and is on its fourth contract, the present one being for 32 Combat Cargo ships, a new type of assault ship which the Navy will operate. This ship is 426 ft. overall, with a 58-ft. beam. It has a rating of 4,025 "light ship" tons. Methods of construction of each type agree generally but differ widely in detail. The methods employed at this yard are typical of those now used by shipyards throughout the country, the basic principle being to spread out the work so that many workers can take part in construction. Wherever possible, work is arranged so that repetitive operations occur and is positioned for greatest ease of execution.

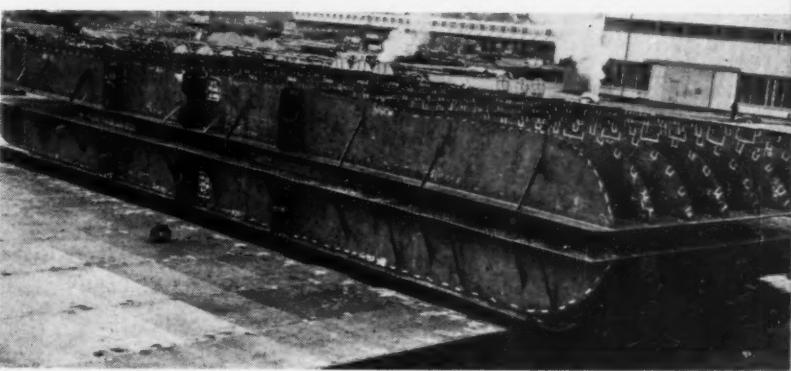
Like most shipyards built during the war, Walsh-Kaiser manufactures little of the equipment used in the ships. Practically all machinery and equipment—motors, boilers, pumps, shafting, propellers, rudder, castings, electrical equipment and so forth—are obtained complete from manufacturers, with the exception of some final processing and fitting.

To explain most easily the construction methods used here, the shipyard may be considered to be divided into two parts: hull construction and outfitting. This is not exactly true, because one phase dovetails with the other, but the operations are different and the two divisions are headed separately. Hull construction consists of the building of the all-steel struc-

U. S. Maritime Commission Photos



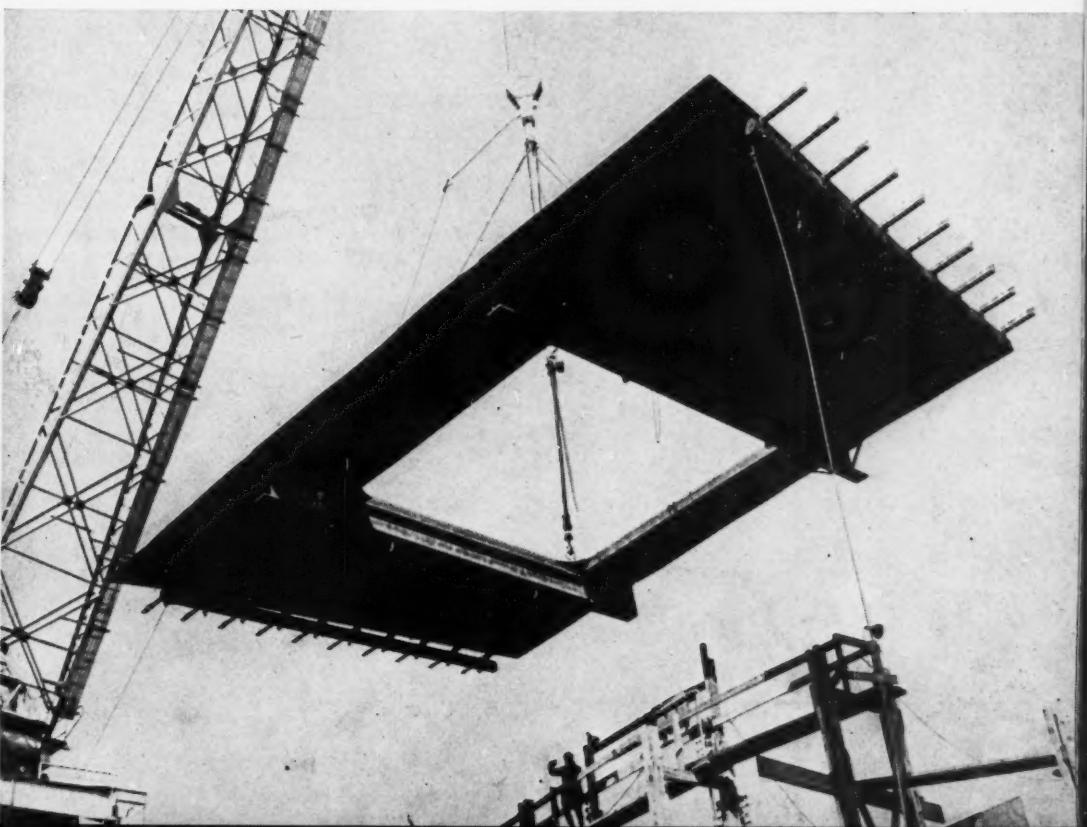
CENTERLINE PLATE, one of series which constitute keel of combat cargo hull, is set in place. Piecemeal construction methods, as shown here, were temporary expedient used on first few hulls when construction progress paralleled design progress.

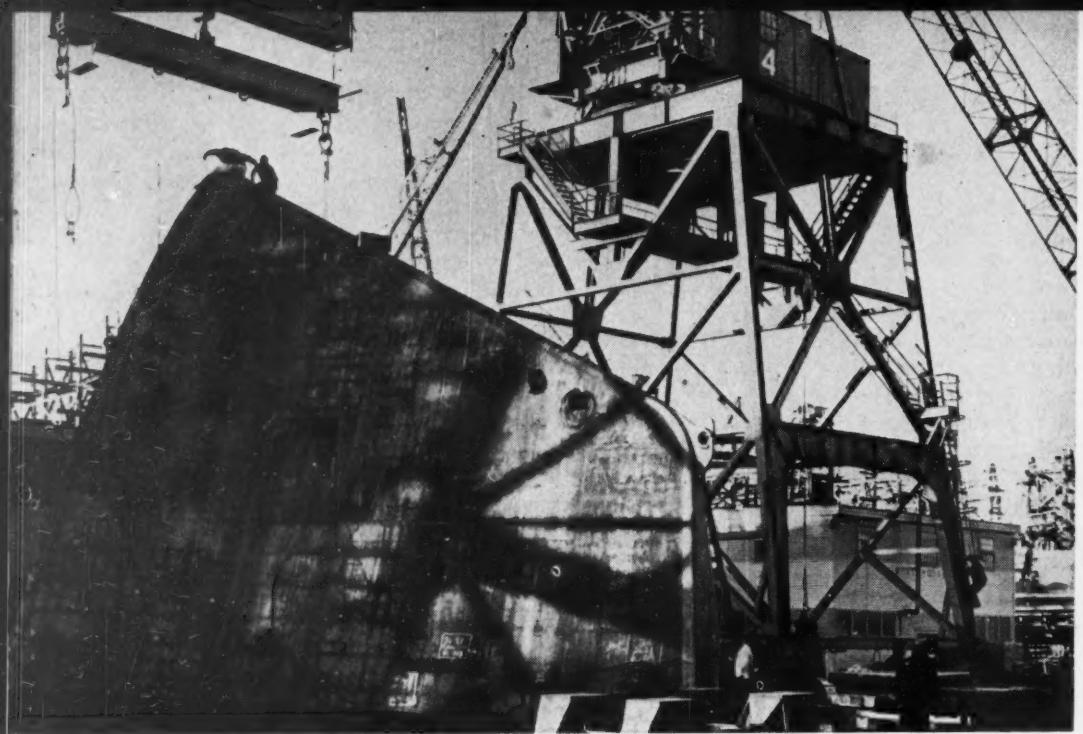


BACKLOG of assembled inner-bottom sections awaits installation of piping systems and will then be ready for erection on shipways. Markings on edge of steel indicate that intermittent weld is to be made at those points.

JACK MACDONALD (below) directs building of combat cargo ships as vice-president and general manager of Walsh-Kaiser Co., Providence, R. I.

WHIRLEY CRANE (below) lifts deck section on to hull. Notice heavy stiffening and rounded corners at hatch opening of section. Beams along two sides are temporary stiffeners to prevent distortion during lifting.

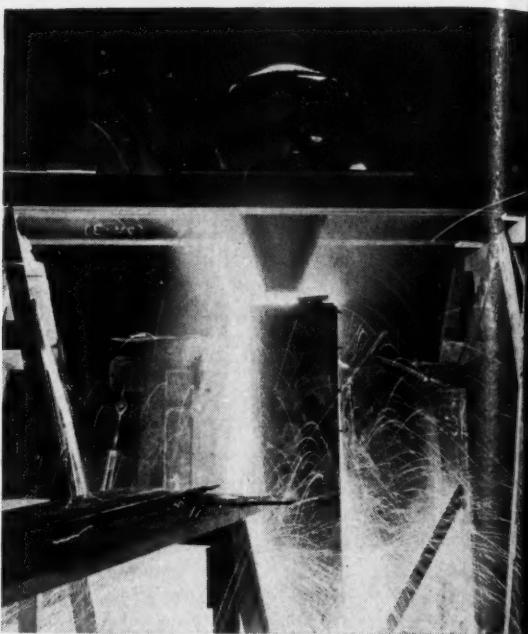




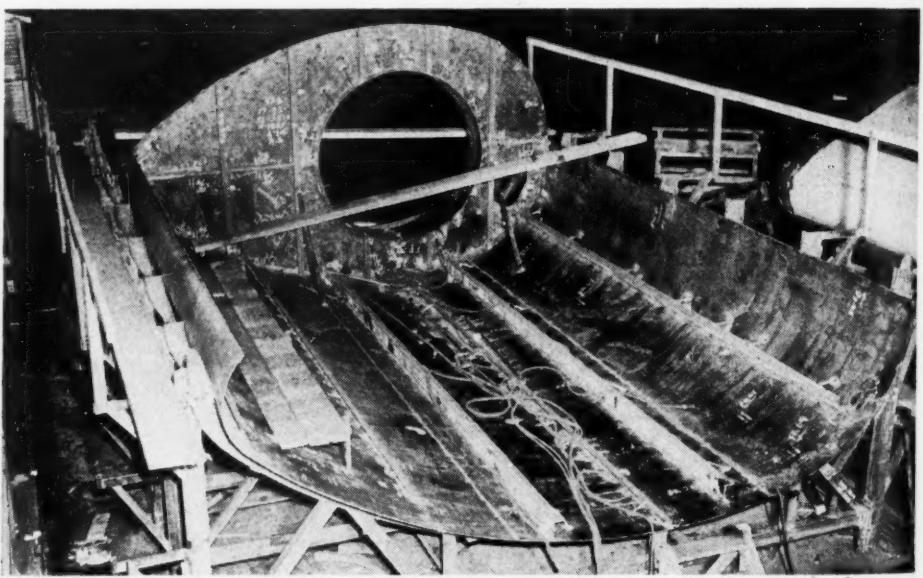
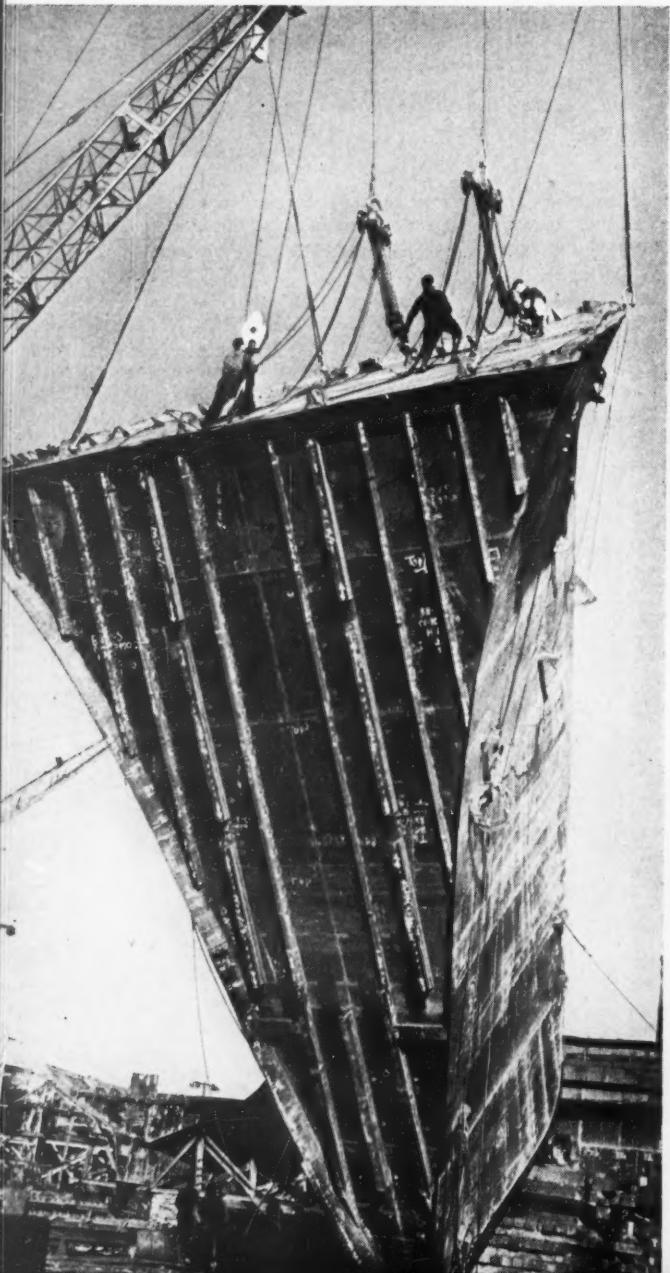
BOW SECTION, weighing 80 tons, is prepared for transfer to shipways. Point on which two men sit is actually highest forward point when bow is in its ultimate position, as section is turned on its "back" for ease of construction.

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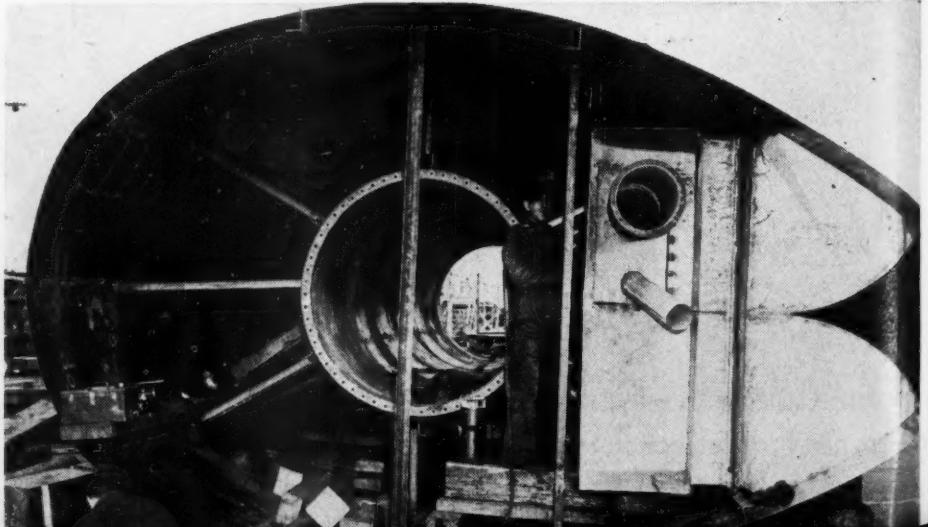
BOW SECTION (below) is lifted upright prior to connecting to hull. This is completely watertight section, containing forward ballast tank and chain locker for anchor chain. Heavily stiffened bulkhead, called "crash-bulkhead" is first completely watertight partition aft of bow.



SPARKS SHOWER AND FLASH as reaction takes place in Thermite welding of propeller shaft strut. This A-shaped unit is received in yard in three pieces which are carefully machined and aligned before being welded.



TEARDROP DESIGN of smokestack (below) makes it practical to inclose ventilation ducts and steam escape pipes as well as funnel, resulting in smooth contour on finished ship.



ture of the ship, as differentiated from the placing of machinery, equipment, piping and wiring in the hull, which constitutes outfitting.

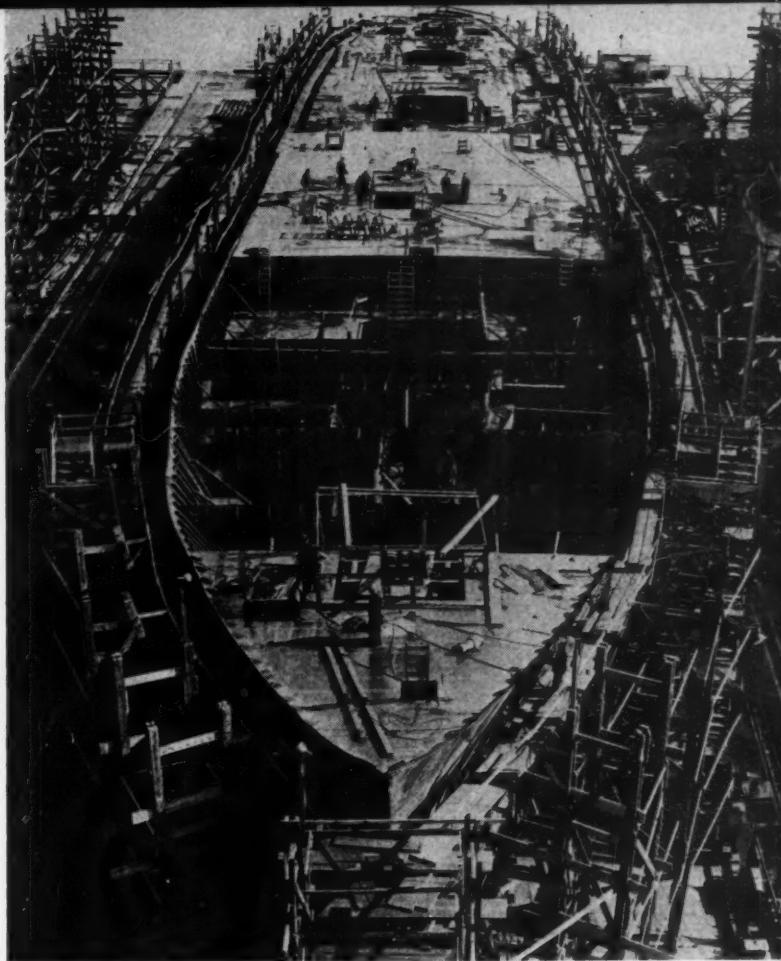
Steel Plate Cut and Shaped—In accordance with a pre-determined production schedule, steel is disbursed from the neatly piled stocks in the storage yard to the 640x252-ft. plate shop where it is met by the required templates, ordered out at the same time. Made of wood and used over and over again, these templates are constructed from hull lines as laid down on the mold loft floor in accordance with the designer's plans. The number of similar pieces of steel to be cut depends upon the status of the design, the rate of construction of hulls, the number of sub-assemblies which can be built at one time and the capacity for storage of fabricated parts. As a general rule, three to six hulls of steel are run through the shop at one time.

Handling of steel is smoothly accomplished with roller tables, adapted lumber carrier trucks, and ten bridge cranes. It is possible for the cranes, which have capacities ranging from 10 to 15 tons, to travel the length of the shop, the area being divided into three bays of approximately 80 ft. each. These are augmented by 50 jib cranes, most of which are equipped with electric hoists. The vast majority of the steel is cut with oxyacetylene torches, both hand and machine operated, and the remainder is either sawed or sheared.

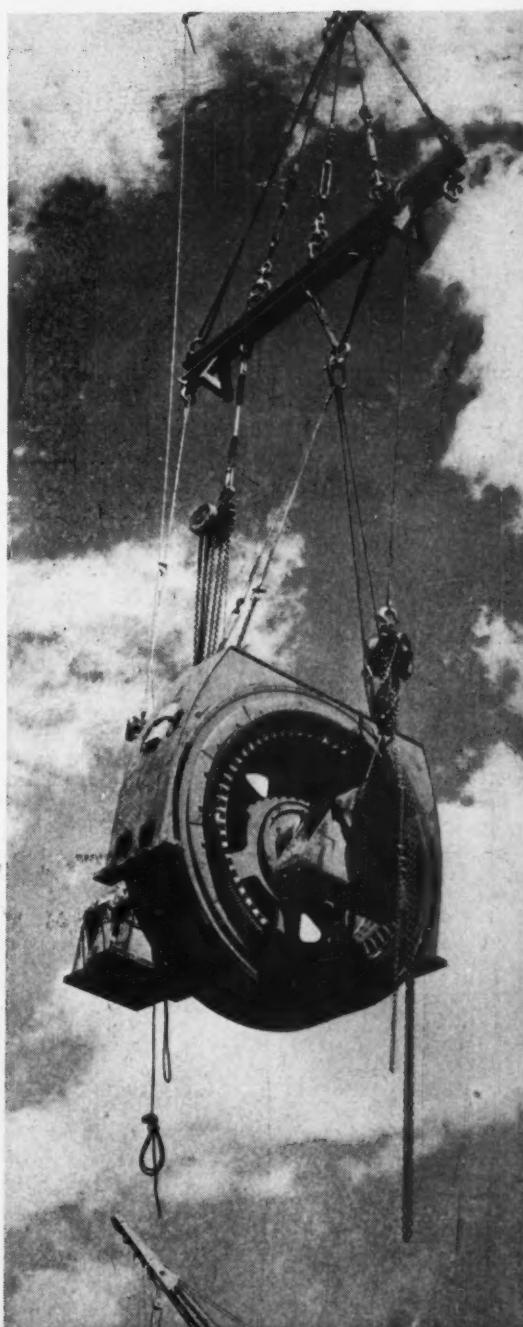
Curved plates are given shape by rolling them back and forth through a 32-ft. pyramic bending roll until the desired curvature is obtained, as indicated by special templates. Three oil-fired furnaces are used to raise to red heat those plates and shapes which require special bends, the hot steel shapes being drawn out of the furnace to a cast-iron slab and bent around steel templates by means of pneumatic jacks plus plenty of active prying and hammering on the part of furnace men. Heavy plates are bent on the 400-ton keel bender or 200-ton hydraulic bulldozer. Other machines, too many to mention here, are used for punching, rolling and shearing, making the plate shop one of the busiest as well as noisiest shops in the shipyard.

40-Ton Assemblies

Following fabrication, the steel is moved either to storage or directly to the adjacent 620x300-ft. assembly shop. This building has eight 75-ft. bays running parallel to the line of flow of material, and it is serviced by a total of 16 bridge cranes ranging in capacity from 10 to 25 tons. Protection from the weather, ample handling facilities and stable construction



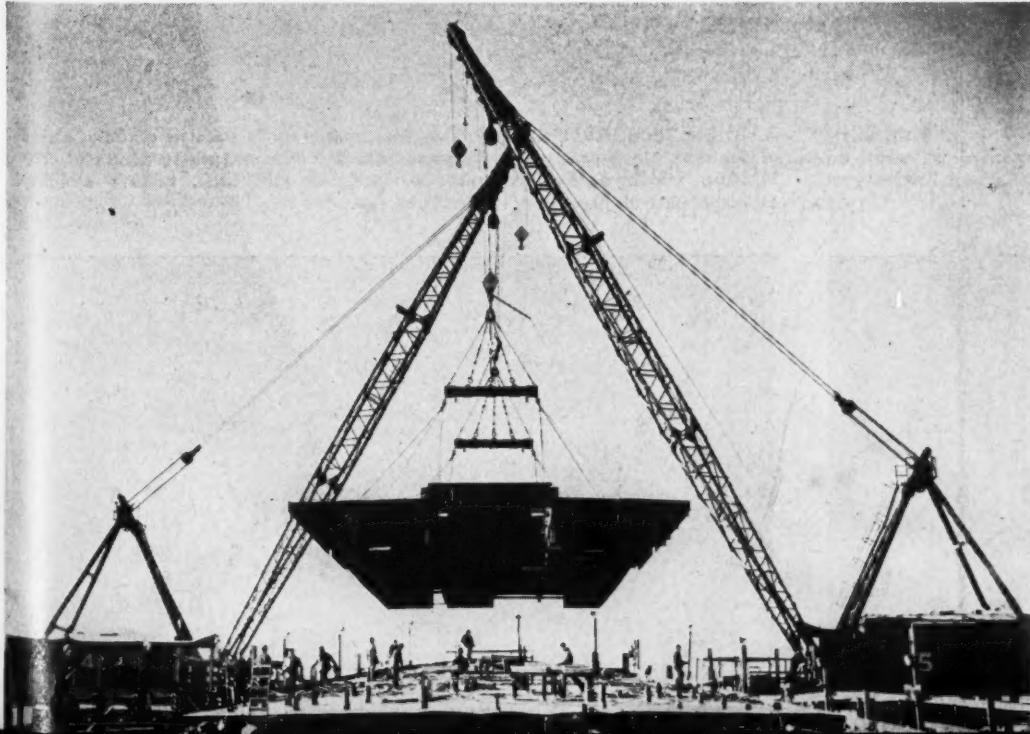
INTRICATE COMPARTMENTATION and ribbed shell construction of partially completed combat cargo hull (above), are visible in this view from whirley crane boom.

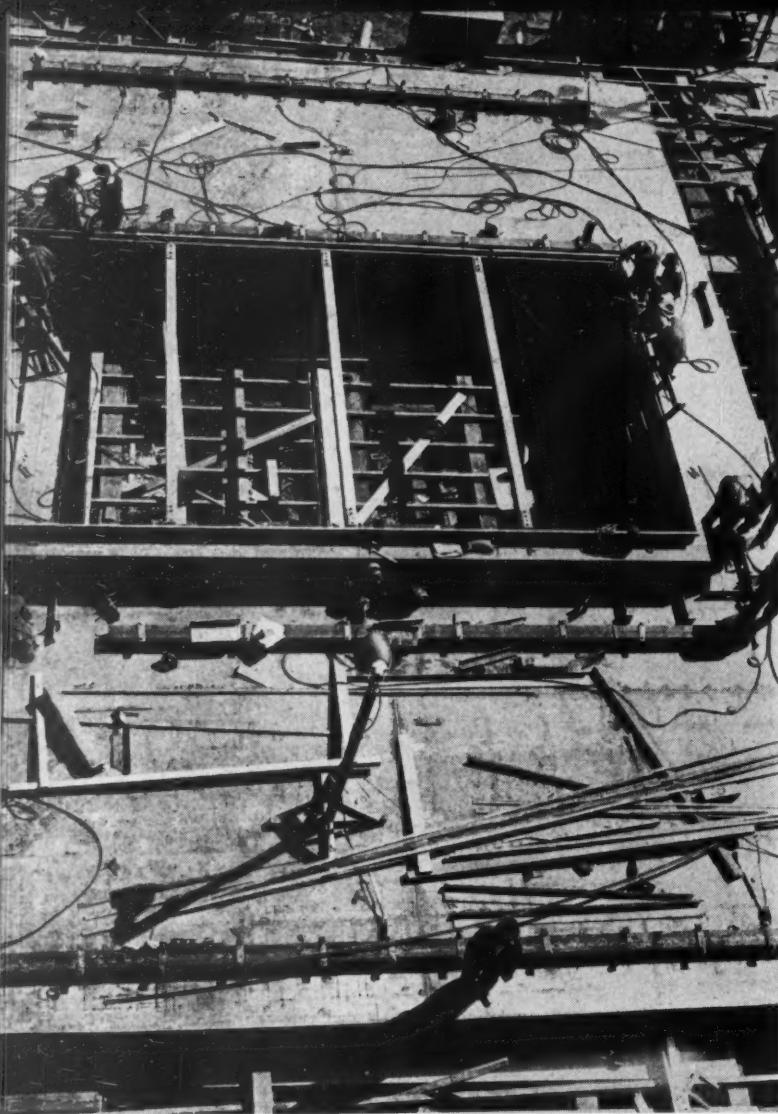


MAIN PROPULSION MOTOR, one of two, is hoisted into place (right). This unit is about 10 ft. in diameter.

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MAIN DECKHOUSE SECTION is lifted by two whirley cranes, one on each side of hull under construction at shipyard.





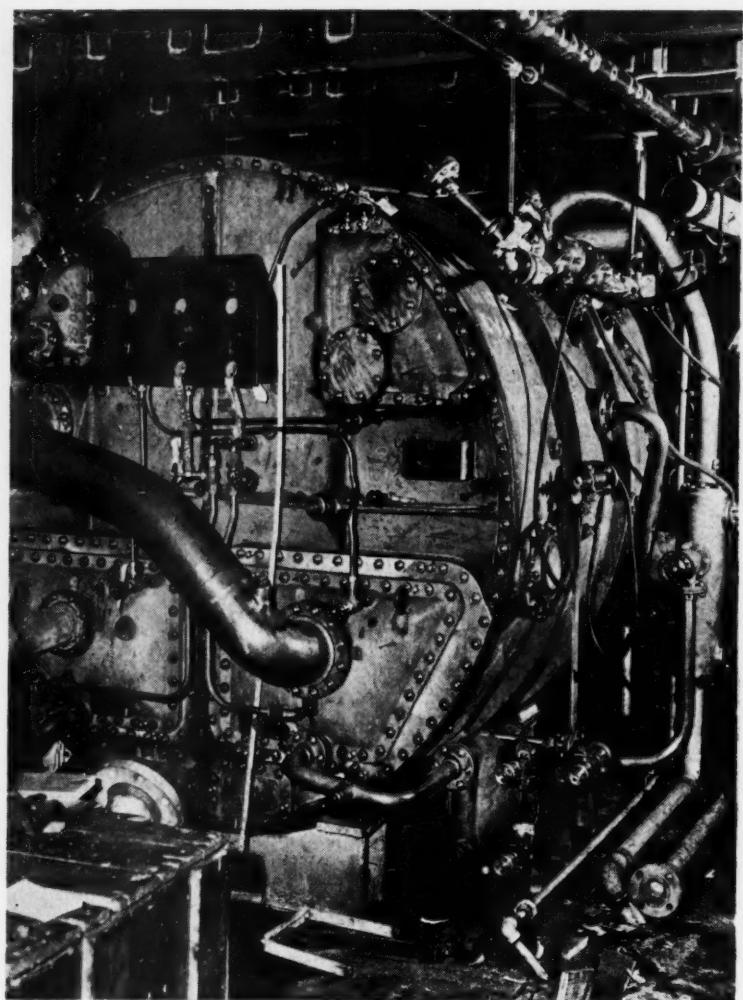
AT HATCH OPENING upper deck section is welded. Working side by side, men and women do this work daily on three shifts.

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platforms make the shop a great asset to production. Assemblies as large as 40 tons are built here, some in jigs and others as flat work. Most of these units are sub-assemblies which are incorporated later into larger final assemblies after being transferred by truck and flat-bed trailers a short distance to the outdoor assembly area.

This area, one of the most spectacular locations in the entire shipyard, is where the tremendous hull sections are built. A key to speedy construction, these monster slices of the hull from keel to main deck, 30 ft. long and nearly 60 ft. wide,

TWO FOUR-BLADED PROPELLERS (below), one on each side of hull, drive ship. Single large balanced rudder is just behind propeller and strut, on which are mounted zinc plates to prevent electrolysis between bronze propeller and steel hull.

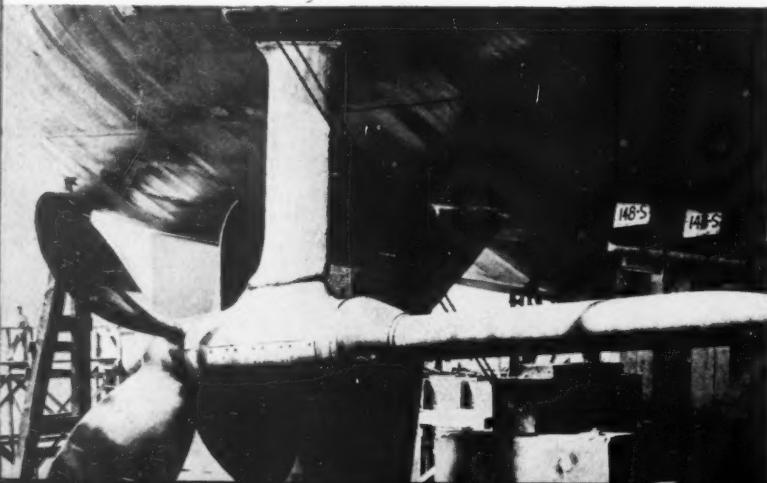


SALT WATER EVAPORATOR UNIT is installed in hull. Each unit must be placed in proper sequence to avoid necessity of removing and replacing large sections of decks or bulkheads, since space is at premium. Evaporator is received complete from vendors, but all piping is fabricated to shape in shipyard before installation.

have slashed months from shipways time. The secret, as explained previously, lies in the fact that the all-welded sections are built where many workers can conveniently and efficiently do their jobs and are positioned in such a way that the thousands of feet of welding are most easily accomplished.

In this shipyard, the outdoor assembly areas correspond to the shipways, amounting to 450-ft. extensions of the ways but, unlike them, are built level and are of simple construction. Both the shipways and the platens, as the areas behind the ways are called, are serviced by 50-ton capacity whirley cranes

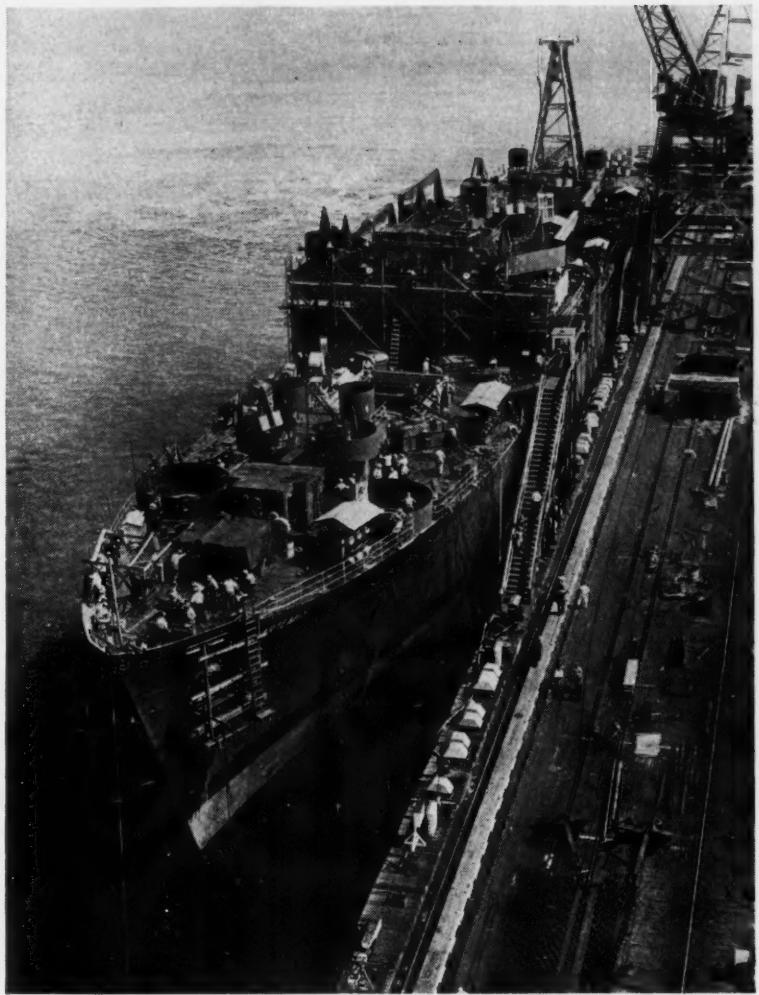
LAUNCHING CRADLE (below) is adjusted. Rudder is pivoted slightly ahead of centerline to permit proper balance. Fin-like structure along center of ship is skeg which gradually tapers forward into flat keel, adding stability to completed ship.



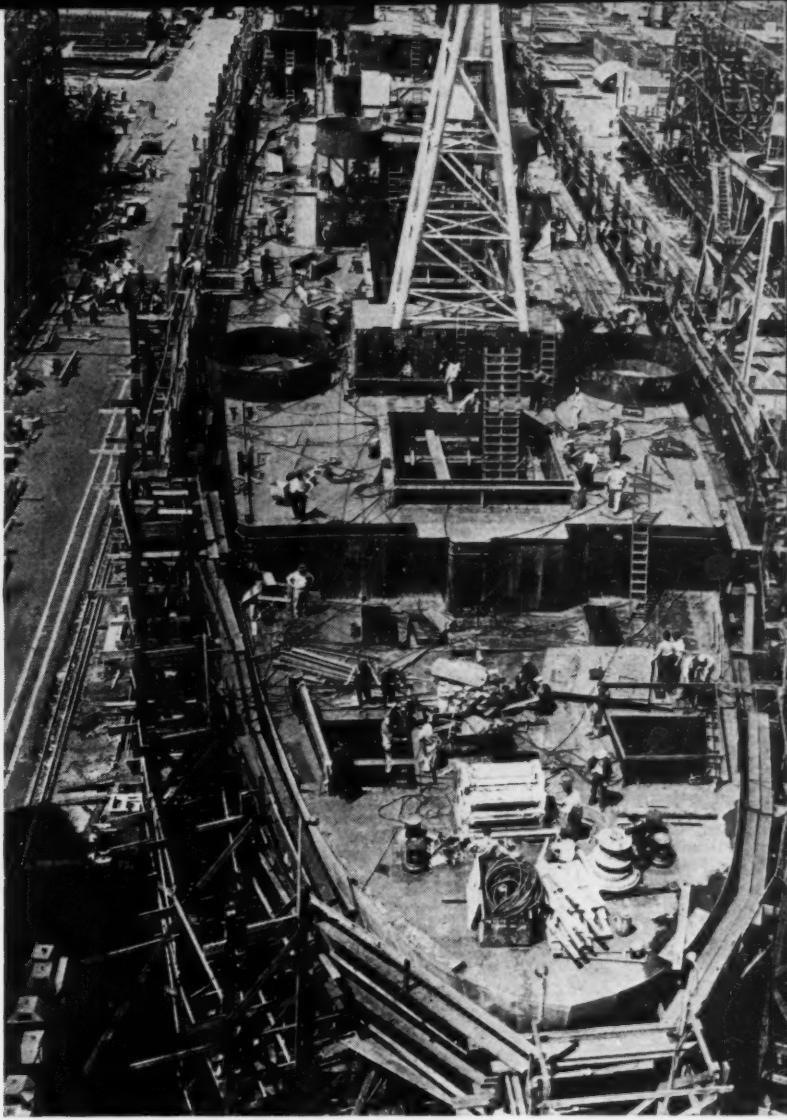
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HUNDREDS OF WORKERS in continuous round-the-clock schedule speed completion of ship at outfitting pier where mechanical work and installation of piping, electrical and ventilation systems is completed. Note roofed racks for welding machines stationed at strategic points along deck. These racks each hold six machines and provide for quick access and great mobility.



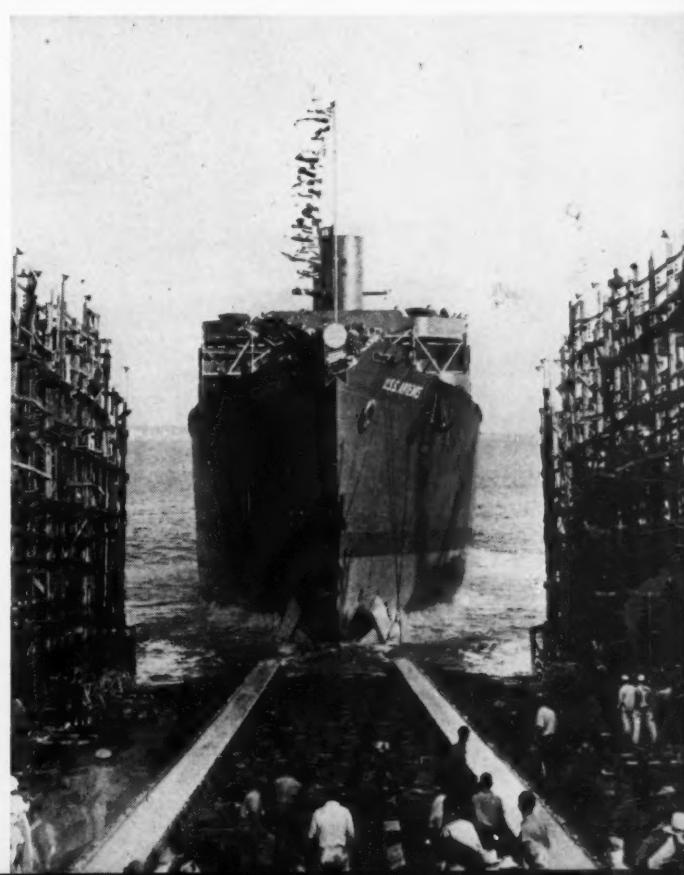
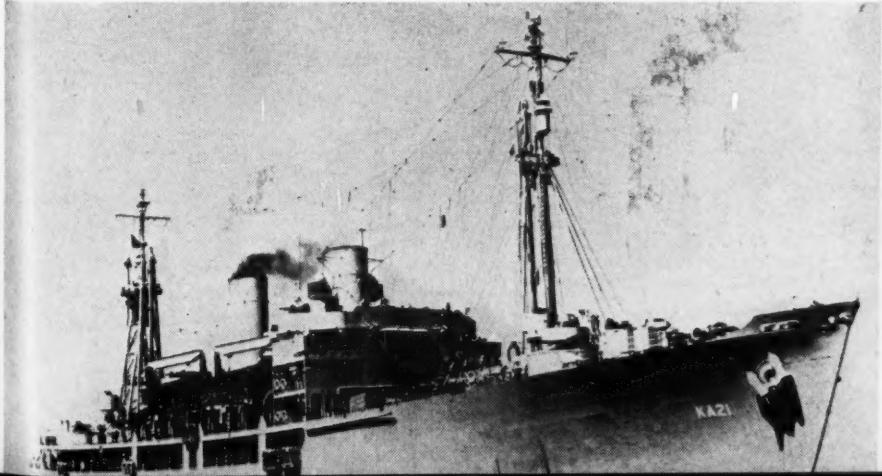
COMBAT CARGO HULL, pictured aft to forward, is almost ready for launching. Large tower in center supports cargo booms for two holds and eliminates usual array of heavy guy lines necessary on single kingpost.

which travel on craneways between the ways and platens. Each platen specializes in construction of one or more types of sections and supplies those for any of the six ways. Transfer of a section from one point to another, such as Platen 1 to shipway 6, is accomplished by a huge trailer having 16 wheels, steering from either end and capable of carrying more than 80 tons. Lighter sections are carried on trailers or relayed from platen to platen by the whirley cranes.

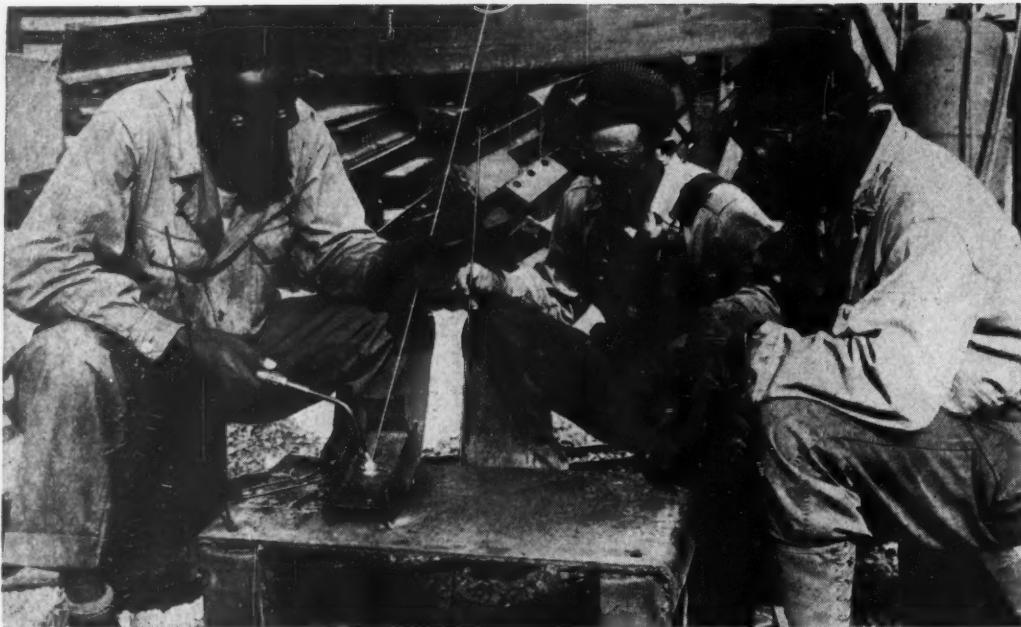
The entire ship is preassembled in this way instead of con-

(Continued on page 148)

U. S. S. ARTEMIS, first ship of her class to be launched (below), goes on sea trial after 180 days on ways and 100 days at outfitting pier. For 12 hr. she is put to grueling tests witnessed by members of trial boards of U. S. Navy and Maritime Commission. Seventh ship of this class required only 69 percent of man-hours used to build first hull.



Structural Steel School



OXYACETYLENE WELDING on structural steel is practiced by student at Army Engineer school under eye of instructor and fellow student.

TRAINS ARMY
ENGINEERS



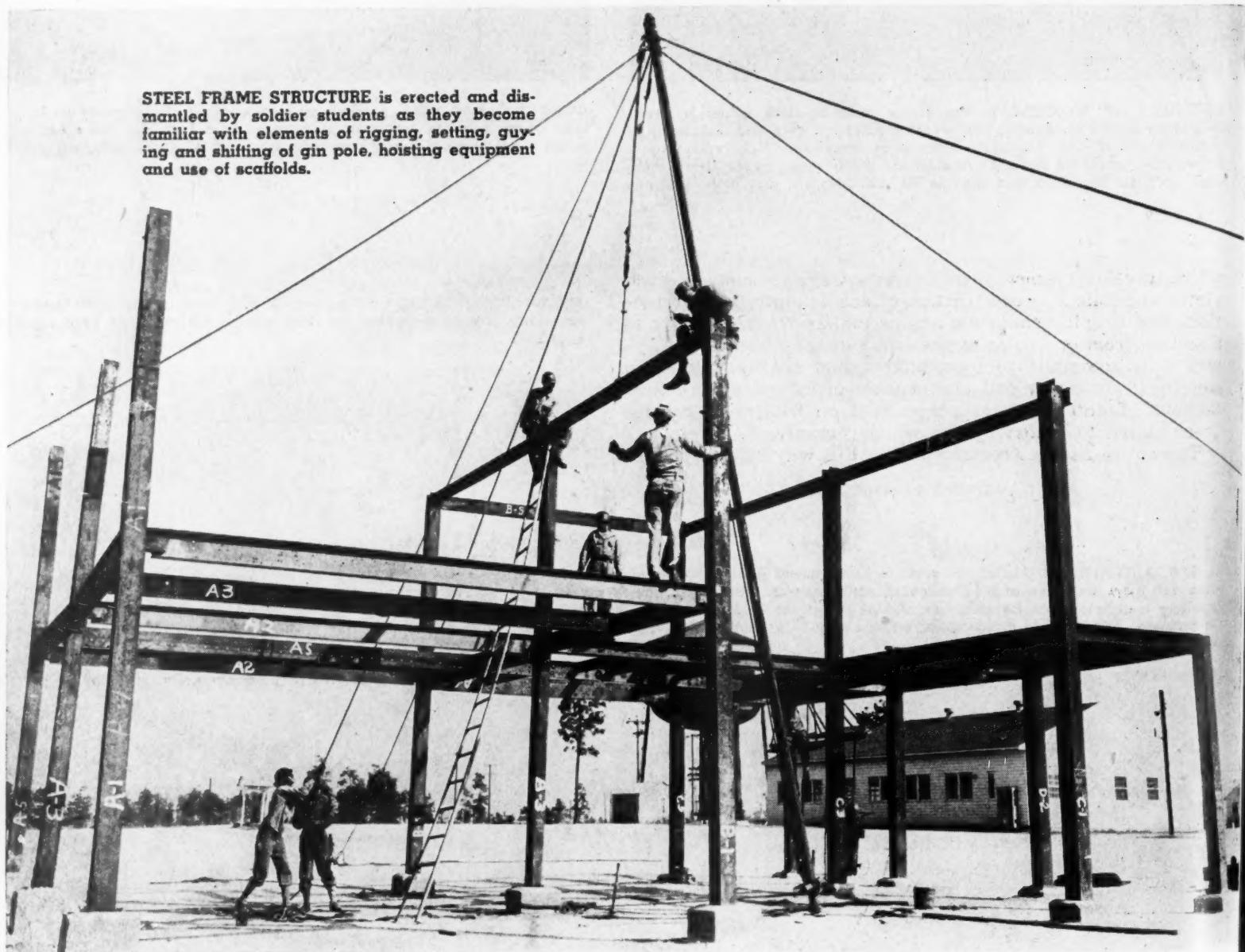
FIELD TRAINING for selected members of Army Engineer units to build, reconstruct and reinforce steel bridges, steel hangars and other steel structures used by tactical military units is provided by a structural steel workers school recently

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STEEL FRAME STRUCTURE is erected and dismantled by soldier students as they become familiar with elements of rigging, setting, guying and shifting of gin pole, hoisting equipment and use of scaffolds.



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PNEUMATIC RIVETING HAMMER is used by enlisted man on heavy practical work. Man in back of channel is "bucking up" with back up bar.



BORING AND REAMING TEAM uses pneumatic drill in fabricating steel channel at Engineer school.

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set up at the Army Service Forces Training Center, Camp Claiborne, La. The school is headed by Captain R. L. Hubach; his assistant, Captain M. F. Bartnett, supervises all instruction in structural steel layout and erection.

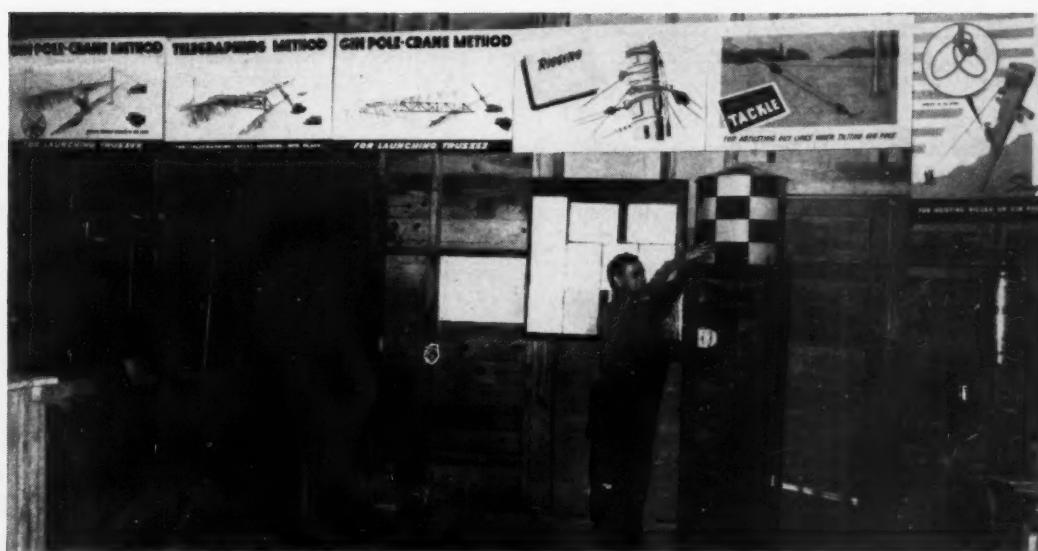
Other members of the staff furnish instruction in the principles of structural steel fabrication, including cutting, riveting, welding, blueprint reading, fabrication of members, and the principles of rigging, guying and hoisting as applied to the erection of steel structures.



SEMI-PERMANENT HIGHWAY BRIDGE is erected and dismantled under supervision of instructors. In background, cableway extends between two steel poles for launching trusses.



HEAVY CHANNEL is cut by student using oxyacetylene cutting torch. Channel will be fabricated as member of steel frame structure.



SUPPLY AND TOOL ROOM CLERK adjusts tank on top of model steel tower. On wall are some of training aids used for instruction in rigging, launching and erecting steel highway bridge. Work done by students is on display.

Army Engineers Build Pipelines



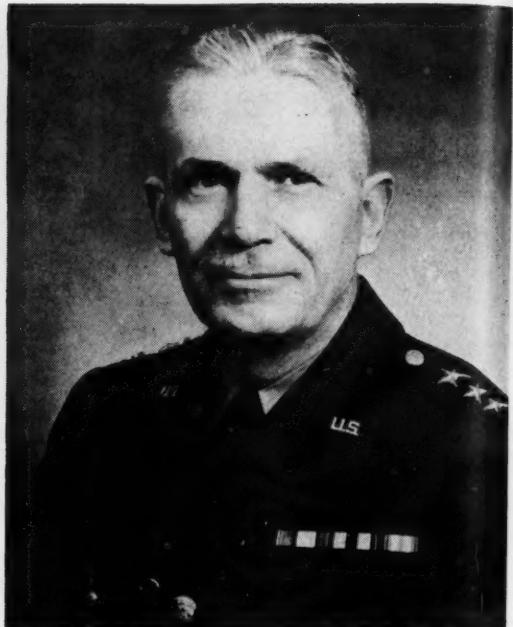
PETROLEUM PIPELINE sections are welded by Army Engineer petroleum distribution units in France.

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From an address Dec. 20, 1944, before the Metropolitan Section, American Society of Civil Engineers, New York City

IN THIS WAR, for the first time in our history, we undertook substantial preparations prior to the outbreak of actual hostilities. One of the major, if not the major, factors in this preparation was the construction program of the War Department, which got under way early in 1940 and which was the largest construction program ever undertaken in

this country, involved every type of engineering and every type of engineering problem including some new ones that we had never heard of before. As of the end of November, 1944, the Army's construction program in continental United States amounted to \$10,200,000,000. It involved the construction of 500 camps, 765 airfields, 167 storage depots, 150 major munitions plants of various types plus hundreds of other miscellaneous facilities. At the height of the program in July, 1942, the Army was placing construction at the rate of \$750,000,000 per month. It was employing directly



AS CHIEF OF ARMY SERVICE FORCES, General Brehon Somervell directs "everything but actual fighting" for U. S. Army.

or indirectly more than one million workers, the majority being contractors' employees, and had 250 architect-engineer contracts and 3,400 construction contracts in force.

In addition to the construction program here in continental United States, a major program was undertaken in such outlying bases as Hawaii, Panama, Bermuda, Trinidad, Brazil and Iceland. This program involved major air fields, housing, port and storage projects. It amounted to another billion dollars.

The completion of the construction program here in the United States and in the outlying bases did not end the role of the Engineers in the war. The Engineer troops in the Army constitute 8.7 percent of the total strength of

WALL IN MASONRY BRIDGE (below) is drilled to support sections of petroleum pipeline.

TRESTLE BRIDGE (below) carries pipeline over rough country to feed gas and oil to front line troops in France.



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1945 —

Roads, Airfields on All Fighting Fronts

By

LIEUTENANT GENERAL
BREHON SOMERVELL

Commanding General, Army Service Forces

the Army. In addition to the combat Engineer battalions with each Infantry division and our general service regiments which constitute the greater part of the Engineer troops, the Army has and must have such specialized Engineer units as water supply companies, port construction and repair groups, petroleum distribution companies, power plant repair companies, topographic battalions, forestry battalions, salvage and



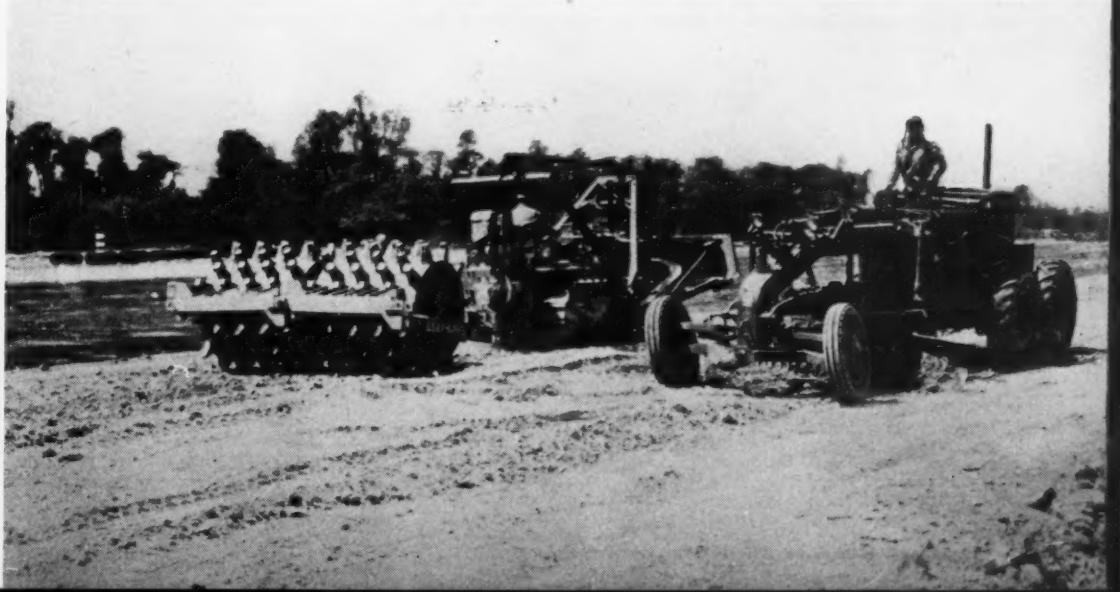
U. S. Army Signal Corps Photos

CORDUROY ROAD is constructed by U. S. Army Engineers in Belgium to replace former muddy route.



AIRFIELD IN FRANCE is graded by Caterpillar tractor equipped with LeTourneau angledozer, followed by LeTourneau scraper and Galion road grader.

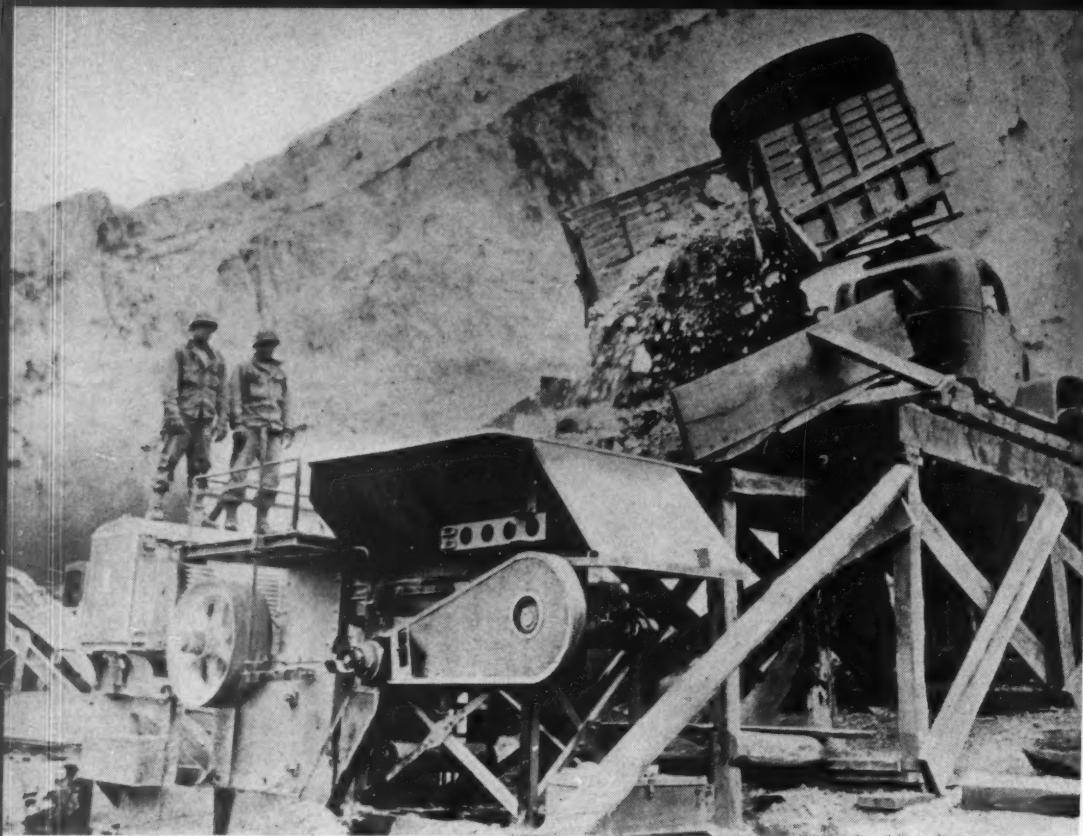
AFTER GRADING (below) LeTourneau sheepsfoot roller packs down earth to make firm base for airplane landing mat.



dockage companies, refinery tank construction and pipe-fitting companies. In all, there are 30 different types of Engineer units in the modern Army.

Oil Pipelines and Bridges

One of our outstanding accomplishments has been the development of portable petroleum pipelines for movement of gasoline and other petroleum products. These pipelines passed the acid test of battle in North Africa and have been a vital factor in our advance across France. In North Africa they were laid at the rate of 20 mi. a day; in France this rate was considerably exceeded. One mile of the line, including pumping stations, weighs but 13 tons, or less than one-half the weight of the normal line with a 5,000-bbl.-per-day capacity. The sections of pipe can be fitted together



QUARRY is operated by Engineers in Venfro Sector, Italy. Here rock is dumped into Iowa crushing and screening plant.



COMBAT ENGINEERS use air compressor and drills to cut pavement for patching in France.



DEBRIS IS CLEARED in areas to be used for docks for LST's at port at Civitavecchia, Italy, by Caterpillar tractor equipped with LaPlant-Choate dozer, while soldier in foreground operates paving breaker.

CAPTURED FROM GERMANS, cement, narrow gage track, industrial cars and concrete mixers (below) are used by Aviation Engineers to supply concrete for road that will circle airport under construction in France.



with a leak-proof connection in a matter of minutes. One Army truck and crew can carry and handle easily 1,000 ft. Using flexible joints, the pipe sections can be laid on top of any terrain accessible to trucks. The pumping stations are mounted on skids and a complete station is transported in two trucks. Special pumping stations have been developed for boosting the flow through the pipelines.

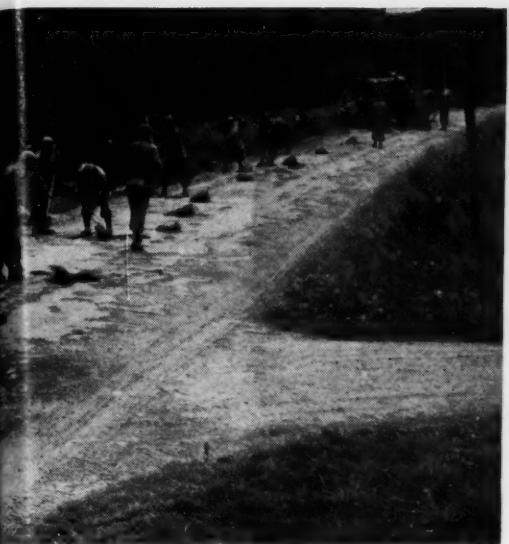
We have had to do much in the designing of special bridges. New designs and working drawings have been prepared for a single-lane and double-lane highway bridges with clear spans of 20, 30, 40, 50 and 58 ft. We had to design steel treadway bridges using pontons which would carry a 40-ton load. We have a portable suspension bridge for the use of foot troops and pack animals. We use three specially designed and simplified tramways in mountainous areas where even animal pack routes are difficult or impossible.

Airborne Equipment

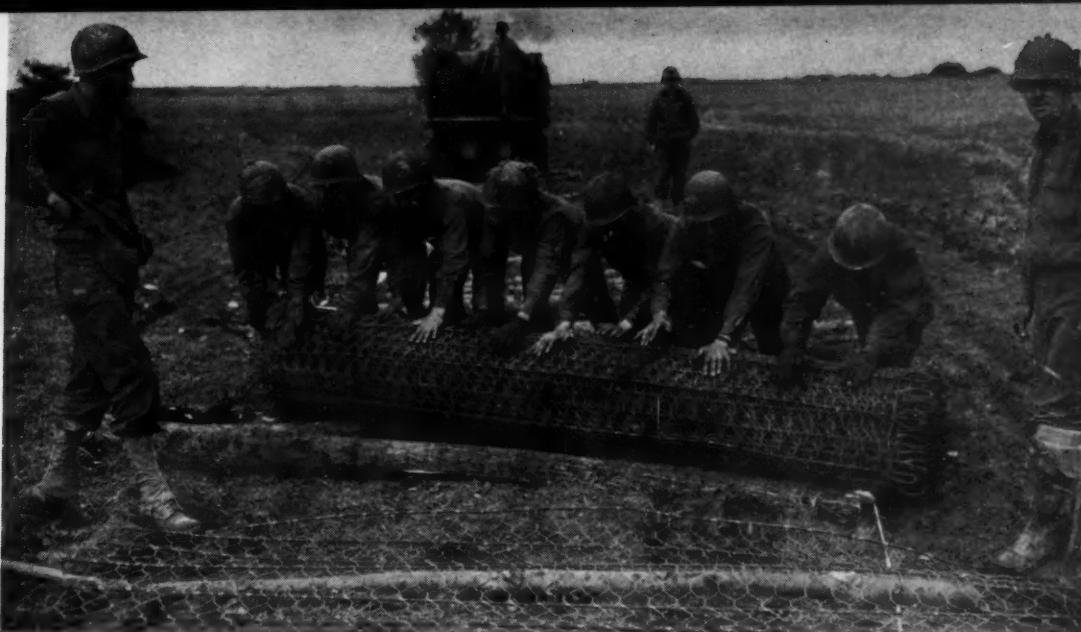
In many military situations, construction equipment must be flown in, if airfields are to be constructed with the necessary speed. We have a bulldozer which can be flown in assembled condition in a large transport plane. This equipment was too small, however, to do the job satisfactorily. Consequently we devised special disassembly methods so that 20 vital pieces of construction equipment could be broken down, shipped in airplanes, and immediately assembled for use. At one time in Tunisia a call came in to the Engineers to build bombing runways at a forward site. The Engineers were flown approximately 1,000 mi. to points as close as possible to the

UNLOADED
brought from
China pipeline

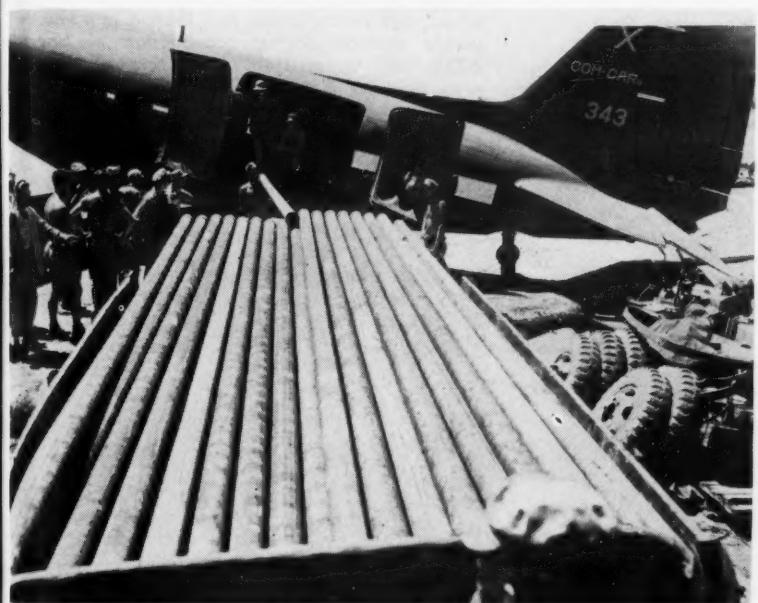
CHINESE WORKERS
American Engineers
and reconditioned



UNLOADED from C-47 cargo plane sections of 4-in. dia. oil pipeline (below), brought from India to Burma, are ready for use in building India-Burma-China pipeline.



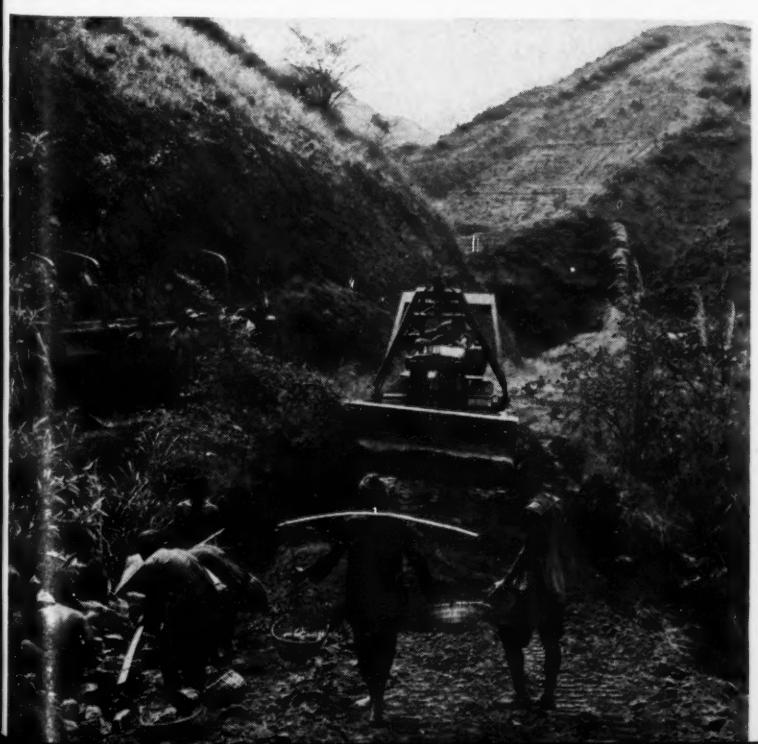
WIRE MAT is laid on poles across open country near Lorre, France.



CHINESE WORKERS (below) carry away boulders in wicker baskets as American Engineer operates bulldozer on section of Burma Road being cleared and reconstructed to Suiwan River.

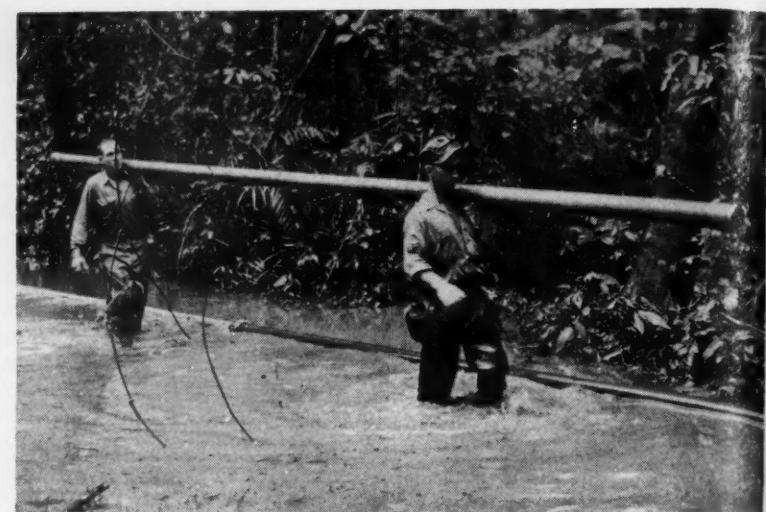
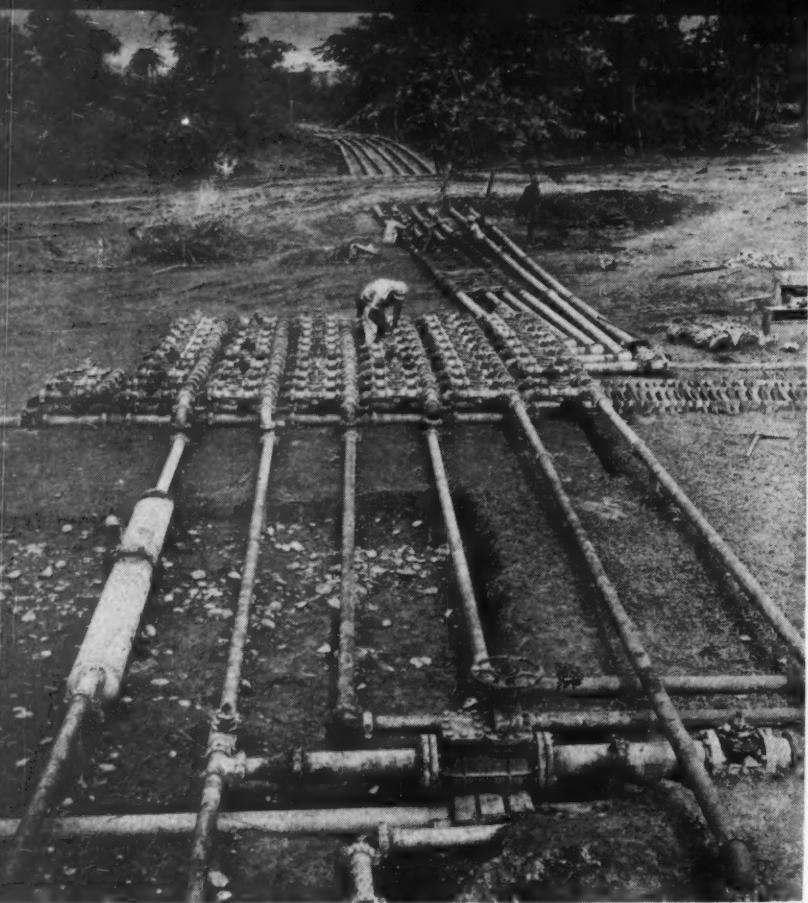


HIGHWAY BRIDGE in Normandy is reconstructed by American Engineers, here shown placing planking for deck.



SPIKES ARE DRIVEN (below) by GI's working on railroad in France.





MANIFOLD VALVE SYSTEM (left) is installed by Engineer unit on world's longest military operational pipeline in Burma.

SECTION OF PIPE of 4-in. dia. is carried through jungle 8 mi. south of Warazup, Burma, by members of Engineer Petroleum Distribution Company.

LOOSE CORAL (below) is scraped over Saipan Island cliff by bulldozer and loaded into trucks by power shovels during construction of base for B-29's. At upper right is section of three-lane road built by Aviation Engineers in five days to speed movement of coral for runways.

Air Forces Photo

HUGE
ceiling
rubber Co

sites selected for these airdromes. They marched to these sites and went to work. Within three days from the time the call went out, the Engineers completed the preparation of runways at one site and the first flying fortress had begun operations from the new field. A second field was ready on the following day. The Commanding General of the Aviation Engineers remarked afterwards that our Allies couldn't believe their eyes when they saw heavy construction equipment being unloaded from airplanes and going right to work.

There are many other noteworthy developments, such as the special trailers built for hauling logs and pipes on very rough terrain and other trailers for use on soft terrain, the new equipment for the analysis of water, the new methods of detecting and treating toxic agents in water, the highly efficient distillation units which transform sea water into potable water, the new methods of rapid



WORN T
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road cuts c



pavement construction including the mixing of bitumen with wet aggregates, the land odograph which will automatically plot the course taken by a moving vehicle for reconnaissance maps, the special military level used in plotting elevations. All these and many other developments during the war have enabled us to keep the Engineer troops overseas supplied with the best possible equipment.

It has taken tremendous quantities of
(Continued on page 154)

AVIATION ENGINEERS (left) cut into coral mountain on Saipan in Mariannas to rip out half million yards of white coral for B-29 base. Two-and-a-half-ton trucks are lined up to carry coral down central island highway to airstrips.

Page 72 — CONSTRUCTION METHODS — February 1945

Big Tire Recapped For Earth-Moving Equipment



1 **HUGE EARTHMOVER TIRE** is rolled into receiving room at plant of Goodyear Tire & Rubber Co. ready for recapping.

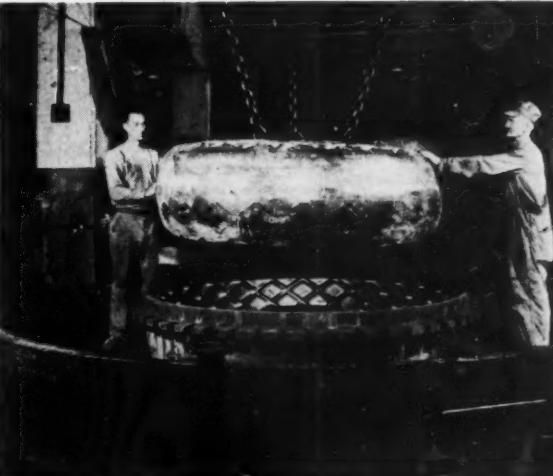
LARGEST TIRE ever recapped with new tread at plant of Goodyear Tire & Rubber Co., Akron, Ohio, is shown in accompanying step-by-step photos. Designed particularly for use on large earthmoving equipment, such as carrying scrapers, tire is 24.00x32, has 36 plies, weighs 1,685 lb. and is 6.9 ft. in diameter. Approximately 60 passenger car tires could be recapped with the amount of rubber used for this one unit.



2 **THOROUGH INSPECTION** is made of tire carcass to determine whether its condition will permit retreading. When carcass is found in excellent condition, approval is given to proceed.



4 **CAMELBACK** is applied in endless band to buffed surface of tire and is stitched down by workman.



5 **READY FOR CURING PROCESS**, tire with new tread of rubber applied is lowered into mold where it will remain under constant pressure and proper temperature for vulcanization.



6 **REFINISHED TIRE** (left), with diamond tread design renewed, is removed from mold.



7 **FINAL INSPECTION** (right) shows tire has come through recapping process in excellent condition. It has appearance of new tire and is ready for many more miles of service on construction projects.



HARD FACING of wearing parts prolongs useful life of screw conveyor in Michigan rock products plant. Haynes Stellite alloy deposit is applied with aid of Linde oxyacetylene torch, using excess acetylene flame to produce uniform spreading of facing material. Operating life of conveyors was lengthened from 5 weeks, before hard-facing treatment, to 25 weeks after treatment.

Linde Photo

Page 74



SPECIAL ADJUSTABLE CLAMPS hold side forms securely in place on old pavement during resurfacing with concrete.

MOLDING RAKE AND TEMPLATE (below) shape ridges at designed angle for light reflection on white cement curb constructed by Buffalo Gravel Corp., Harrisburg, Pa., contractor for Pennsylvania Department of Highways on \$717,000 section of U. S. 22 east of city.



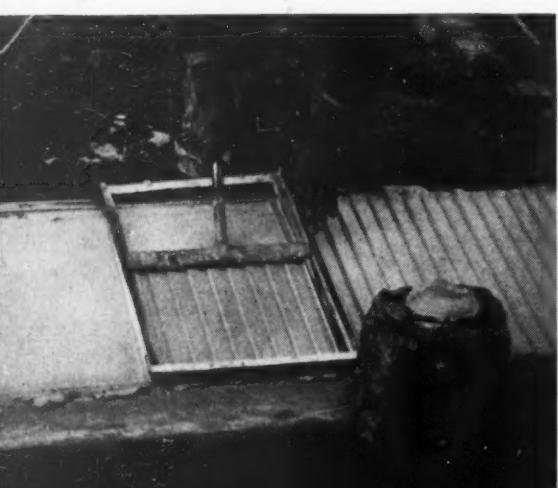
RAILWAY SPIKES are driven into wood ties by Sytron gasoline-powered hammer. Standard unit is equipped with extension handles and spike-centering tool. Also applicable to driving pins to anchor steel road forms, tool strikes 2,000 blows per minute and is controlled by hand throttle.

MINE DETECTOR (below) is used by U. S. Army Engineers to locate water main somewhere in France.

Signal Corps Photo

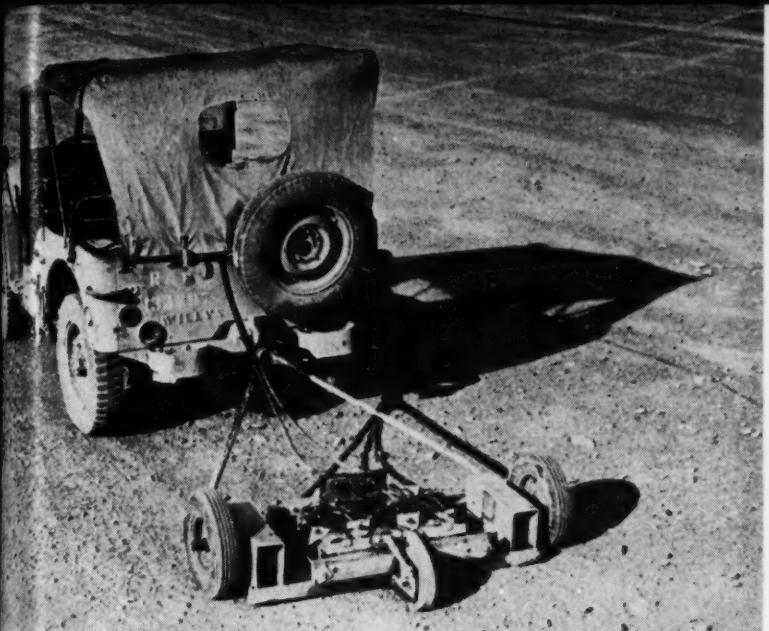


DIRTY PAINT BUCKET is inverted and placed over air-driven rotary wire brush submerged in tank of solvent. Brush scours bucket clean in few seconds, effecting substantial saving in time at Kaiser shipyards, Richmond, Calif.



MAGNE
airfield
generator
It was

DUAL-P
dynamit
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MAGNETIC SWEeper is used to detect and gather metal from runway on airfield in southern Italy. Hooked to back of jeep and powered by two generator sets, device is pulled slowly along, combing width of about 4 ft. It was devised by engineering staff of R.A.F. Wellington Squadron.

British Combine Photo



WITH SPECIAL CLAMP on sling, steel plates are moved and placed by mobile Krane Kar at yard of Consolidated Shipbuilding Corp. Gasoline-powered swing-boom crane has front-wheel drive and caster-type rear-wheel steer. Operator is protected by full-vision, closed cab.

Page 75

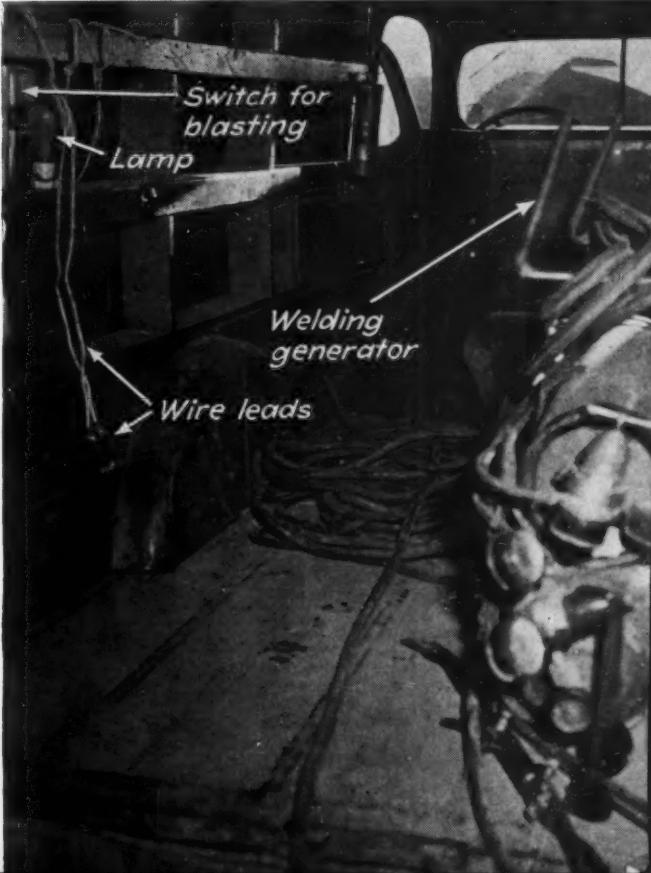


CARBIDE-TIPPED MASONRY DRILLS (left) of Super Tool Co., with shanks lengthened by braze welding, are operated by Black & Decker ½-hp. electric drill, rated ¾ in., to bore ⅜-in. holes through 9-in. concrete ribs of dome on State Capitol Building, Harrisburg, Pa., being restored by McCloskey & Co., Philadelphia, under \$152,000 contract. Rotating drill steel cuts clean ⅜-in. hole through 9-in. concrete without any spalling of surface in 1 min. or less. Drilling is carried on from inside dome by workmen standing on platform supported by permanent steel trusses.

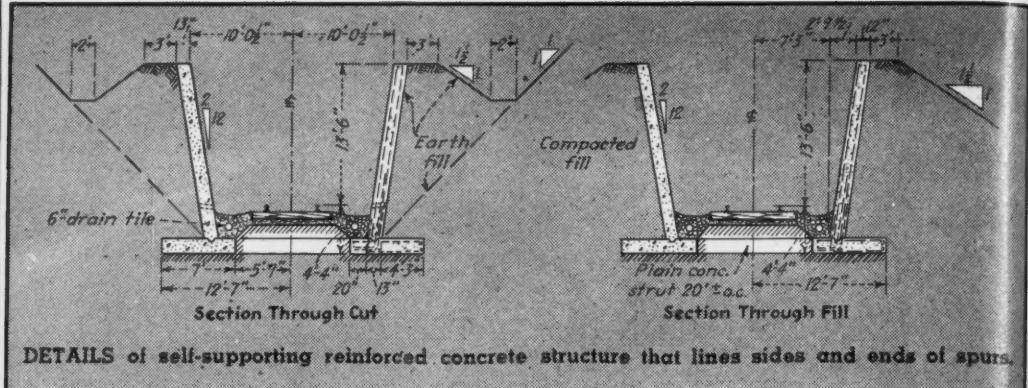
ASBESTOS COVERING (right) is applied to jeep headlamp at U. S. Army 9th Air Force Waterproofing school in England to prevent shorting or injury to reflectors by salt water immersion. When entire vehicle is treated, it can be kept workable and running though covered with water.



DUAL-PURPOSE TRUCK (right) of Fago Construction Co., Buffalo, N. Y., serves for firing dynamite blasts as well as for welding and cutting. Ford truck carries gas cylinders for oxyacetylene cutting or welding and electric generator (driven by power takeoff from transmission) for arc welding. To fire dynamite blast, generator leads are hooked up to switch inside truck body. Lamp in circuit lights when connections are properly made. Blaster throws switch to set off charge. Truck is armored against falling rock fragments (below) by extra, wide-spreading roof of 5/16-in. steel plate, above which is mounted siren to warn workmen when blast is imminent.

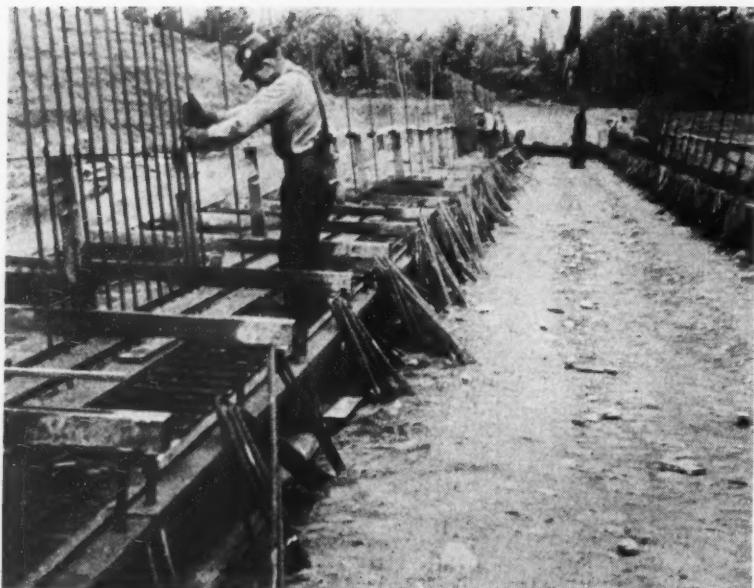


Step-by-Step Field Methods

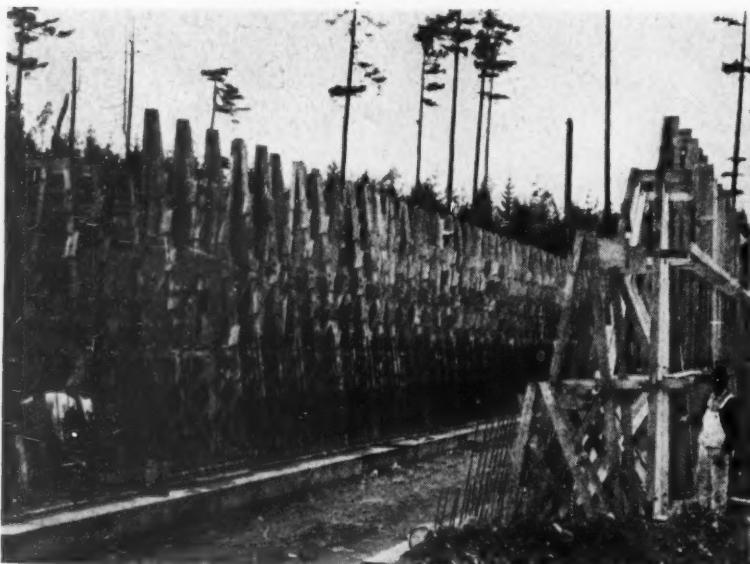


BARRICADED SIDINGS

With Concrete Walls Minimize Danger in Transshipment of Explosives



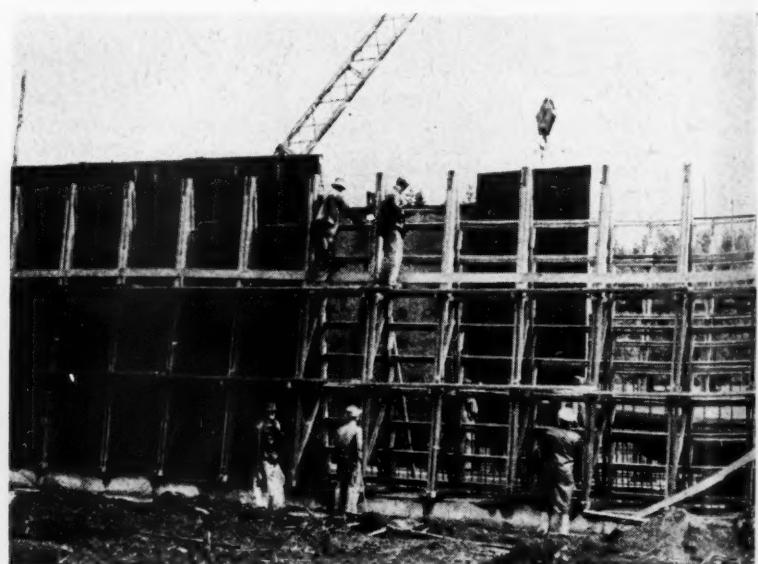
1 REINFORCING BARS are placed in footing forms prior to first concrete pour at freight terminal.



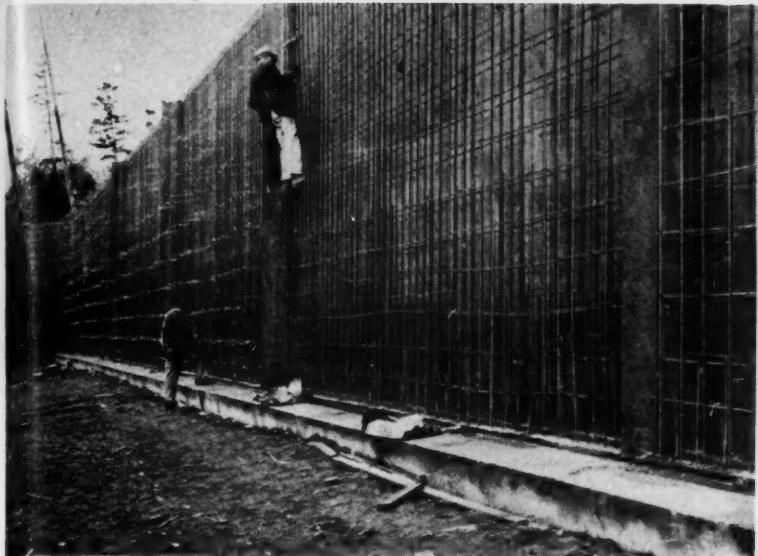
2 TIMBER FRAMES are erected to support panels making up outer wall form of 6x17-ft. panels.

A WARTIME DEVELOPMENT of freight terminal design is the barricaded siding, a relatively safe method of storing cars loaded with explosives. The new plan, which combines speed and safety features in a way to more than offset the extra cost, has been used in several parts of the United States where ammunition and explosives are transferred from rail to water transportation. Space is provided on spurs for a limited number of railroad cars, usually about five on each spur, located in cuts or in the open where they can later be protected with fills or cribs on both sides and around the end. Whether in cut or behind fills, sides and closed end are faced with concrete on the inside.

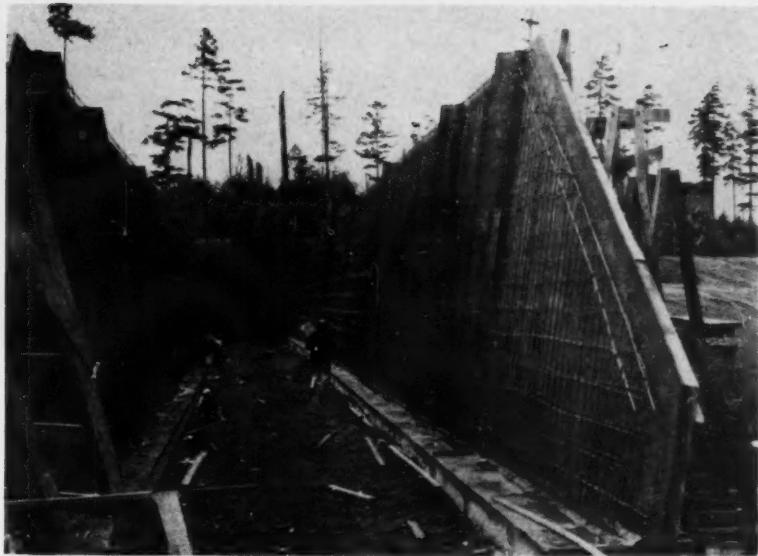
Usually the spur trackage is laid out with a capacity equal



3 PLYWOOD PANELS are placed against frames that support wall during construction.



4 TYING OF REINFORCING BARS is done after outer wall forms are in place to anchor steel.

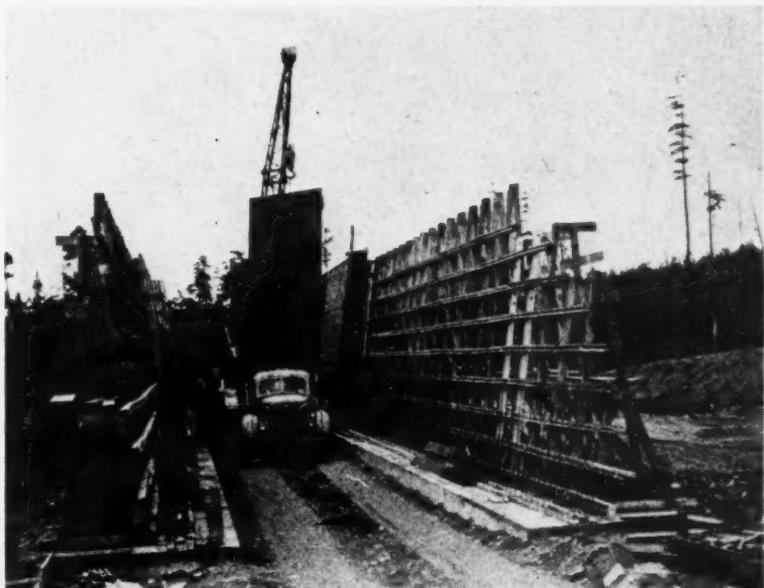


5 STEEL REINFORCING is set in place before inner panel forms are put in and tie wires put through wall.

to a shipload. Thus, when explosives arrive by rail, the cars are put in the barricaded sidings there to await their turn at the nearby loading pier. If for any reason there is delay in transshipment, the cars are held. This avoids the necessity for a rehandling with its attendant risks. In the event of detonation of the explosives stored in any spur, the spacing, staggered plan location, and the protection afforded by embankments, confine detonation to the one spur. The 12 on 2 slope of the concrete faces of the side walls has been worked out as the optimum, all things considered, with a view to dissipating the force of an explosion upward. This slope, of course, greatly decreases the earth pressure against the retaining wall.

In all cases the concrete facing is built as an independent, self-supporting retaining wall. Where the spurs are in cuts, the cut is made wide enough to allow space for erecting forms against which the side and end walls can be poured. A hand tamper is used in fills close to the outside of the wall to avoid the excessive horizontal thrust from heavy tamping equipment on loose fill.

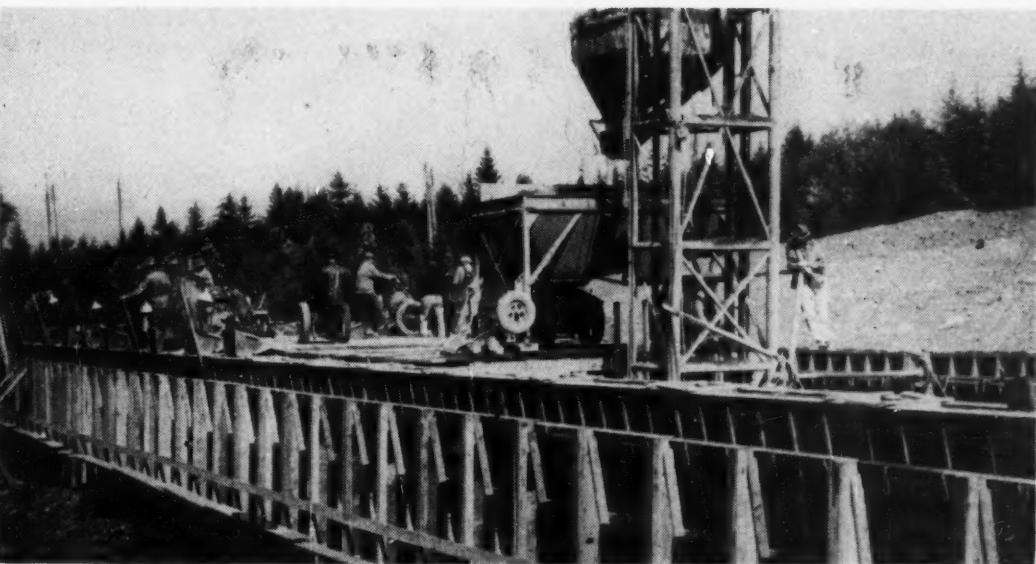
The usual method is to place the wall section in two pours. The first one makes the concrete footing from which projecting anchor steel for the side walls is placed before the pour. Outer wall forms, consisting of 6x17-ft. panels faced with plywood,



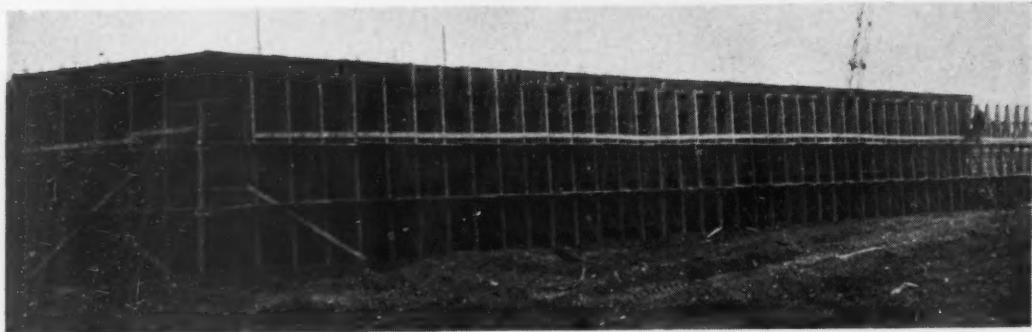
6 INTERIOR FORM PANELS are lifted from truck and placed by crane.



7 CONCRETE IS DELIVERED by trucks that back into siding to truck-mounted elevator that raises concrete.



8 FROM TOP OF ELEVATOR concrete is dumped into hopper serving hand buggies that deliver it over jumbo deck to wall forms.



9

EXTERIOR VIEW (left) shown barricaded siding with wall forms still in place.



10 ATOP SIDE WALLS workmen pry wall panels free. Crawler crane stands by ready to lift.



11 WHEN PANEL IS FREED, crane lifts it, swings it over wall and lowers it to bed of truck waiting in siding.



12 COMPLETED WALLS, extending around siding on flat ground, await backfill. Note other sidings in left background.



13

MAIN-LINE VIEW (left) shows sidings in cut in left background. Tracks have not yet been set in place.

are then set in place, supported by exterior braces or frames. Then the remainder of the reinforcing is put in, supported by tying to anchor steel projecting from the footing. Small concrete blocks are used to maintain prescribed spacing between steel and outer form. After all the steel is in place, inner form panels are set and tie wires or bolts are put through the wall to give the form structure stability and strength. An aid in exact placement of the form panels is a pair of small concrete projections cast in the footing, that serve as spacers at the panel bottoms.

Concrete Distribution

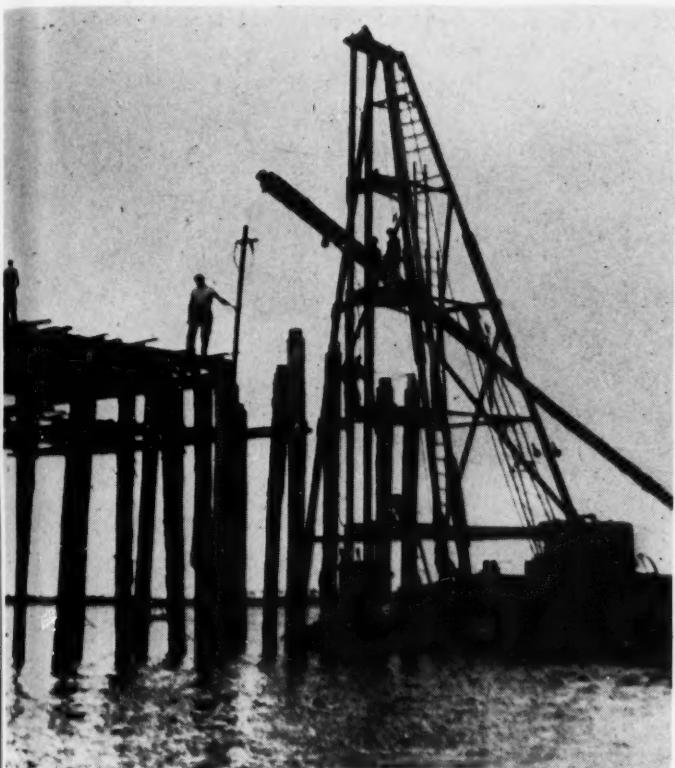
For convenience in pouring, a jumbo built on a trailer is moved into the siding. On its deck which is level with the top of the forms, concrete buggies are used for distributing the concrete. Ready-mixed concrete trucked to the job is elevated to the jumbo deck by a truck-mounted elevator and skip designed for portability, with the elevator hinged to swing down on to the bed of the truck for moving from job to job. The end wall is poured first and the jumbo backs

(Continued on page 144)

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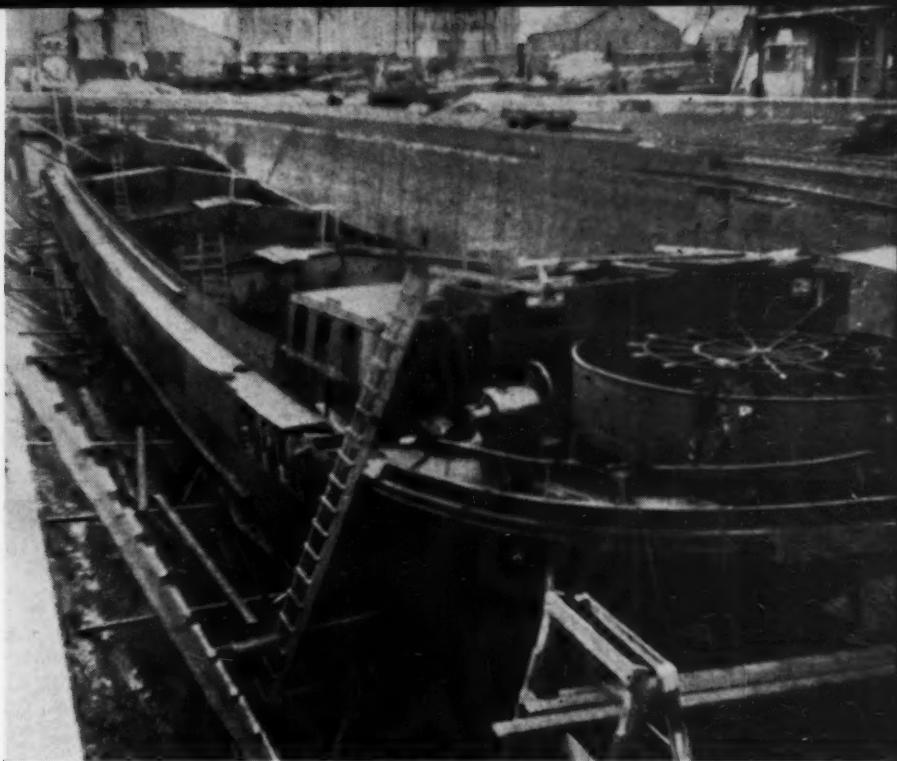
MOSQUITO
base somehow

JOB oddities



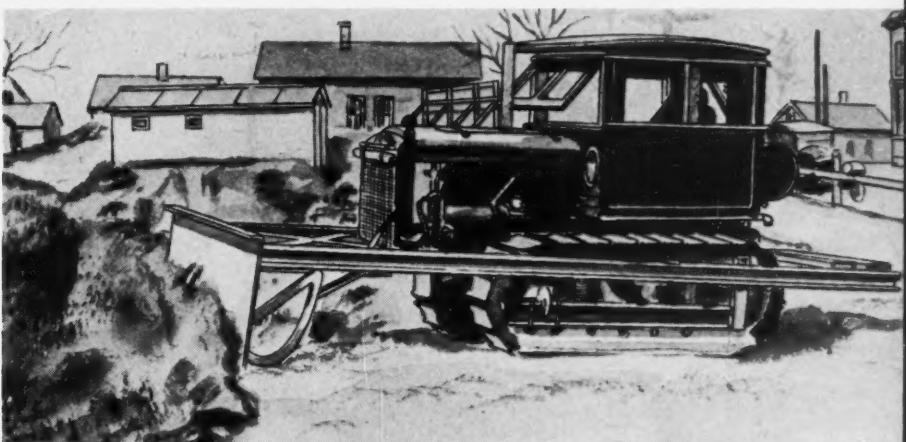
ALL-MAHOGANY PILEDRIVER handles 65-ft., 2½-ton Australian turpentine pile for Seabees in Pacific war theater. Designed, built and operated by CHIEF CARPENTER'S MATE FIVEASH, piledriver was made of wood cut locally and put together without plan drawings of any kind. "Winch" is P&H crane of ¾-cu. yd. size. Rig was entirely dismantled for shipment from job to job, once moving as far as 2,500 mi.

MOSQUITO NETS (below) protect Seabees from malaria-bearing insects while building road at U. S. base somewhere in South Pacific.



HITLER'S INVASION BARGES are now in Allied hands at Antwerp dock which was captured by General Montgomery's 21st Army. Intended for invasion of England, these vessels were never completed.

British Official Photo



FIRST BULLDOZER manufactured and sold on commercial basis by LaPlant-Choate Co. is hand-operated unit, with blade of rigid sheet metal to push material forward and lacking any curvature for rolling it. Built in 1923 for use on Kentucky's Dixie Highway, it was mounted on Best and Holt tractors. Caterpillar predecessors.

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MARINE DRIES LAUNDRY at base in Pacific with aid of trailer-mounted Caterpillar diesel electric set. PFC. JAMES L. FERAN hangs his washing on wire hooks attached to radiator guard.

Marine Corps Photo



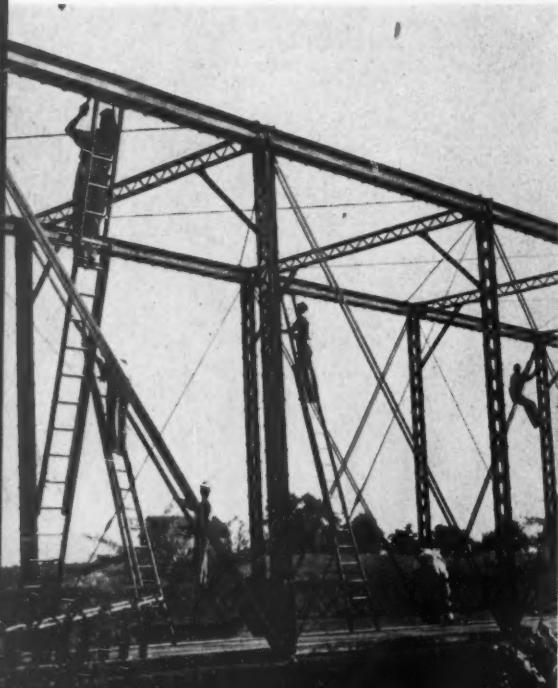
Wartime Highway Maintenance Keeps Essential Traffic Moving

By N. F. SCHAFER
Superintendent of Maintenance
State Highway Commission of Indiana

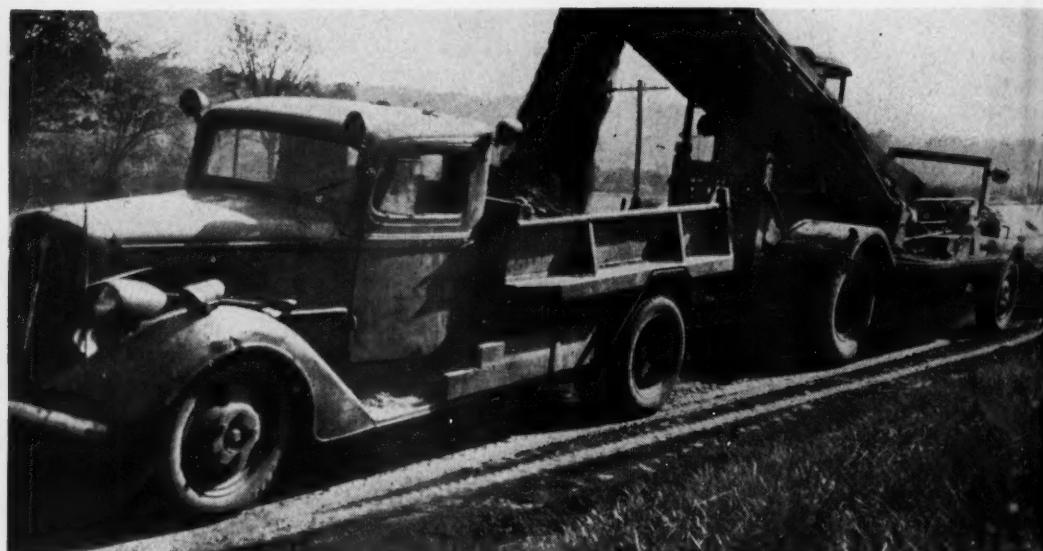


TRUCK IS LOADED with earth from shoulder by Barber-Greene bucket loader.

WIRE BRUSHES AND SCRAPERS (below) are used by bridge crew to clean steel truss members of all dirt, rust, scale and loose paint.



SHOULDER AND DITCH EXCAVATION are windrowed ahead of experimental loading machine by grader drawn by Cleveland tractor.



EXPERIMENTAL LOADING MACHINE picks up earth rapidly from shoulder and loads it into truck.

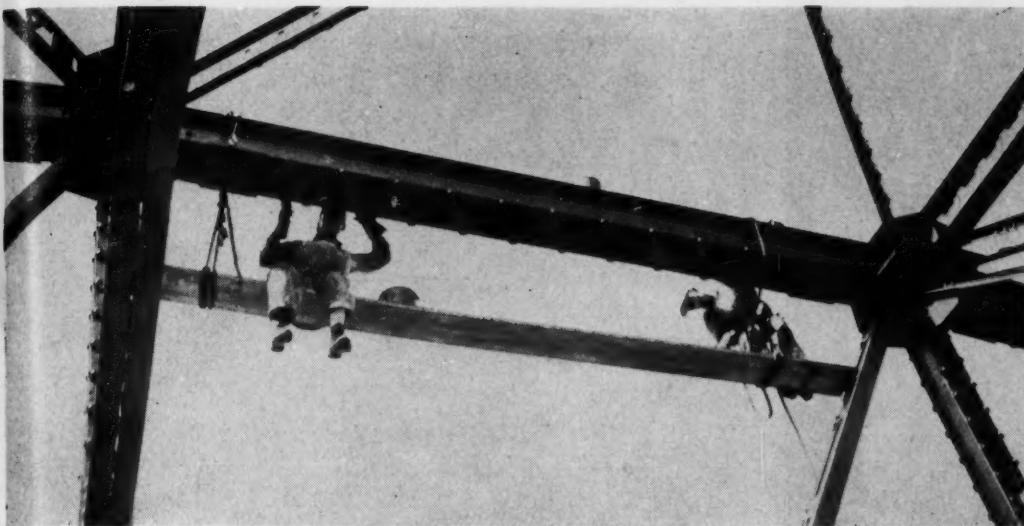
COLLAR IS USED (below) to obtain neat black line in painting guide post.



This is the second of two articles by Mr. Schafer, dealing with the methods and equipment by which highway maintenance is being carried on despite wartime shortages of labor, machinery and materials.

HIGH SHOULDERS will pond water and cause surface failure. Every effort has been made to maintain all shoulders so that they will have sufficient slope to carry the water rapidly from the edge of the surface to the ditch. When shoulders are bladed they are cut to 1 in. per foot slope. This work has been done most economically by cutting the shoulder, cleaning the ditch and windrowing the excavation on the shoulder. This is picked up with a bucket loader or an experimental earth loading machine. This equipment picks up the earth rapidly and loads it into the truck. These operations are done by an experienced crew. Hauling trucks are provided by pooling equipment from patrols near the location of the work.

An aggregate shoulder is often maintained along many 18-ft. cement concrete



STEEL BRIDGES are painted by means of brushes (left) and spray guns (right) on state's five-year-plan.



pavements. This is expensive because aggregate must be added and the shoulder dragged to keep it next to the pavement.

An experiment has been tried that is worth mentioning. The soils department sampled an aggregate shoulder and determined that a stable mix would be 15 percent soil and 85 percent aggregate. This required approximately two-thirds of the existing shoulder to be removed and replaced with 1-in. to No. 30 aggregate.

The shoulder was graded out 6 in. deep next to the pavement and tapered to shoulder grade 6 ft. from pavement edge. One-third of this material was left in windrow and balance was hauled away. The aggregate was added to the windrowed material, then mixed and spread with a blade grader. The mixture was then rolled.

Fertilizer (10-6-4) was added to the windrow before it was mixed and an additional amount was placed on top after mixing and spreading. The total application of fertilizer was approximately 1,500 lb. per acre.

This shoulder was sowed with seed at

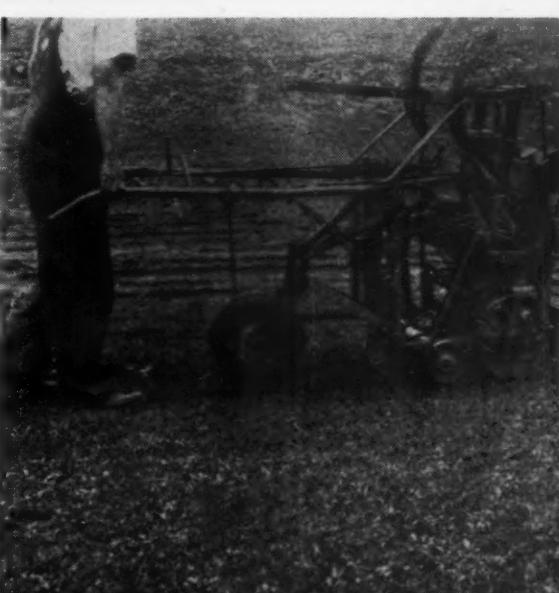


POWER MOWERS operate in pairs for greatest economy in maintaining shoulders of roads.



MAINTENANCE WORKERS clean around bridge shoe and clear channel.

SOD IS UNLOADED and laid on fill slope. Row of willow trees at toe of slope is part of erosion control planned by department.



SODS (below) for roadside improvement are cut by machine.

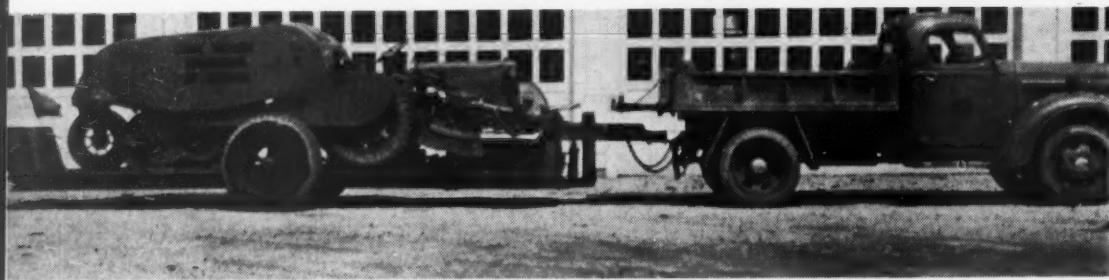


TRAFFIC-LINE MARKER is used to spray paint on metal guard rail.

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SNOW REMOVAL constitutes serious winter problem of highway department.



SMALL STREET SWEEPER mounted on trailer is transported from city to city to clean streets on which state routes are located.

providing a stable grass-covered shoulder that will resist rutting along narrow surfaces.

Last year we had difficulty obtaining paint for guard rail, guard-rail posts and guide posts. By advertising many times some paint was finally procured. All rust on the metal guard rail was removed with a wire brush and the paint applied by means of a brush or spray. A traffic line marker was also used as a means of spraying the rail. A collar is used to get a neat black line around the guide posts.



SEVERE FLOODS menace some highways as in photo above where swirl is starting at unprotected wing wall. Below, riprap has been placed on fill to form jetty.

Bridge Painting

Bridge painting is conducted on a "five-year plan." Each winter the district bridge and maintenance engineers check the condition of bridges in the district. All bridges are designated for painting next year or during the second, third, fourth or fifth years from the time of inspection. The budget for bridge painting can be made up from this report.

Ordinarily all structures having a span of 100 ft. or more are painted by the contract method and smaller bridges are painted by the force account method. In the spring of 1943 bids were received on eleven contracts for painting bridges. Each contract consisted of from five to ten bridges, depending upon the number.

(Continued on page 166)

SIGN CREW (below) replace old metal road sign.



ASPHAL
liner d

SELF-PRO
experime
beads (n
barrier li
sight dis



ASPHALT STRIPE is sprayed on road surface by narrow, long-base centerline during cold weather.



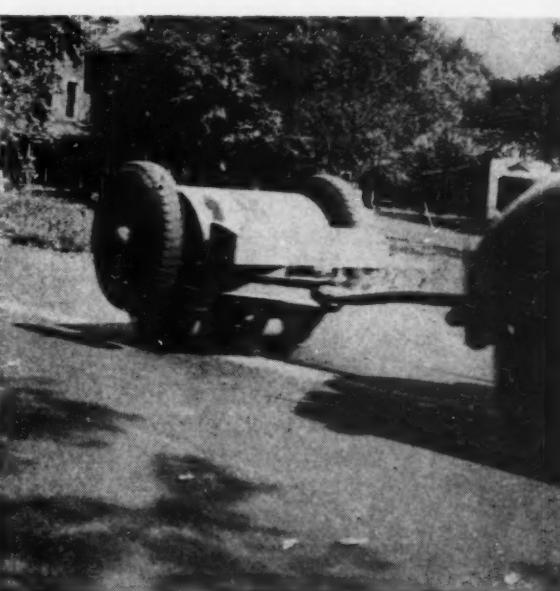
CHIP SPREADER applies stone to asphalt stripe. This truck follows immediately behind centerline machine.



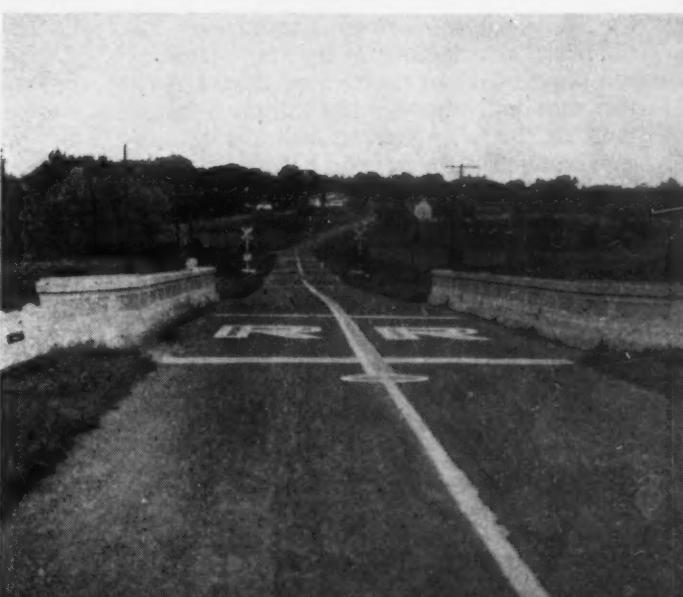
Z-BARS (left) are placed to protect barrier stripes from traffic on roadway after these stripes have been applied by marking machine.



SELF-PROPELLED MARKING MACHINE, now in experimental stage, is filled with paint and glass beads (right) and used to apply yellow Prismo barrier lines (below) to highway points with short sight distances.



WATER WEIGHT ROLLER is driven over painted centerline after chips are spread.



STONE CHIP LINE (below) marks center of highway, with Prismo pavement marking to indicate railroad crossing.

WHERE IS THE MONEY COMING FROM?

St. Louis
Official Ballot
BOND ELECTION
St. Louis, Missouri

VOTES FUNDS FOR POST-WAR WORKERS

BY VIRTUE OF ITS INITIATIVE, integrity and independence in facing facts and taking realistic action to meet them, St. Louis has entered the front rank of that select group of cities which have both blueprinted post-war public improvements and provided the funds to pay for them. The steps toward this achievement are plainly marked for all to see. In essence, they involve three stages: city officials accepted the realities of the post-war situation confronting the metropolis and attacked the problem with wisdom and vigor; when the city's true needs and potentialities were factually presented to a committee of leading citizens, these citizens cooperated intelligently and energetically to develop and make effective the best possible solution; finally, the voters responded nobly to a frank and forthright educational campaign by authorizing at a special election last August 1 a \$43,527,000 bond issue for a carefully selected list of post-war public works.

Facts on Public Debt

The actual story of what has been done in St. Louis can best be told by Milton M. Kinsey, president, Board of Public Service, who has capably carried out the public works policies and directives of the city administration headed by Mayor Aloys P. Kaufmann. Before starting that story, it might be profitable to examine a few facts of national importance which St. Louis studied before it undertook its financing arrangements. By May 31, 1944, the public debt of the United States government had reached 186 billion dollars, well on its way toward the 300 billion mark which it may attain before this war is over. (By December 7, it had increased to 224 billion.) In contrast with this rising federal debt, total local debt in the entire United States amounted to about 13 billion dollars and was steadily decreasing; likewise the total debt of all the 48 states was less than 2 billion and was falling. Looking these cold figures in the eye, St. Louis made the only practical decision and set about raising its own money.



AT HEAD OF GROUP which selects and designs municipal public works projects meeting approval of large citizens committee sits MILTON M. KINSEY, able and energetic young president of Board of Public Service, commonly called mayor's cabinet by St. Louisans.

Speaking as president of the Board of Public Service, before the 1944 annual meeting of the Citizens Post-War Construction Council of Missouri, Mr. Kinsey told the story of the city's post-war public works program in these words:

"We started out by requiring each city department head to prepare a list of post-war projects for his department, together with their estimated cost, and to file these lists at a central point. Simultaneously, our fiscal department began a study of our financial program and prepared estimates of the additional bonded indebtedness which the city might safely carry.

"At this point, we had recommendations for several hundred projects, totaling about 165 million dollars, and, on the other hand, we had a statement from the comptroller that no more than 35 million dollars in new bonds could be issued, to

which there might be added about 20 million dollars of various funds on hand or previously authorized. The 165 million dollar figure, therefore, had to be cut to about 55 million.

"This cutting was done by a very small group of high city officials who rated all of the proposed projects on the basis of their knowledge of the city's needs, having in mind a formula which gave high priority to projects using a high percentage of local labor and material and a low priority to projects which would have a tendency to increase future city operation expenses. That formula was not rigidly adhered to in all instances, but it was kept before us as a guiding principle. Toward the end of this weeding-out process, numerous projects were arbitrarily dropped to make the whole program fit our financial ability.

"At about this time, our mayor appointed a large committee of about 300 outstanding citizens who were charged with the duty of investigating each of the projects and of making recommendations as to its suitability. A list of our proposed projects, which included some 165 items and totaled about 55 million dollars, was submitted to this committee. Because of the size of the task, the 165 projects were divided into 11 main groups, and a subcommittee of the Citizens' Committee was assigned to each of these groups.

Citizens Select Projects

"At this point, we saw democracy at its best. I was amazed to see bankers, insurance executives, merchants, millionaires and other civic leaders trudging through alleys, inspecting bridges, going down into sewers, studying the city's finances and taking time off from their own important tasks to arrive at independent conclusions with respect to the merits of each of our projects. Our mayor requested them not to be mere rubber stamps, but to report adversely on any project which did not meet their full approval and to suggest other projects if they saw fit. Each of these committees reported on the group of projects as-

gned to it, and, in most instances, recommended changes in the list proposed by the city officials. In fact, they added projects which increased the total to \$63,000,000, and they assisted in re-study of the bond situation, the final decision being that we could stretch the bond issue to \$43,500,000. Almost without exception, the Citizens' Committee recommendations were adopted.

"While this procedure was being carried out, lawyers, expert in the legal phases of bond issue procedure, were preparing the ordinances and bond issue proposals to be voted upon, and a publicity committee gave radio talks, decorated billboards, issued news stories, and passed out handbills to inform the public of the program. One interesting phase of the publicity was a ballot by school children and their families in which they expressed their preference on the various projects proposed. This plan was eminently successful; in fact, so successful, that the 50 thousand ballots which were returned could not be analyzed in time to publicize the results before the election.

Post-War Jobs Assured

"As a result of the careful preparation, the various items in the bond issue were carried by majorities of about 5 to 1. Now we have a program and the money to pay for it. The program does not depend on any federal assistance. It stands on its own bottom. However, if federal money should become available this program can readily be extended by reinserting projects which heretofore have been rejected. We, at City Hall, now know exactly what projects are to be constructed and how much money will be available for each of the items, and we are now proceeding to translate this whole program into blueprints.

"At present, approximately six million dollars worth of work could be let on contracts within a few days after cessation of hostilities, even though the war should end tomorrow. We intend to keep on with our program of making many millions of dollars worth of work ready for taking bids, and in carrying out this intention we shall continue to utilize all of the private engineering and private

100,000 LEAFLETS of this kind, distributed to pupils of public and parochial schools throughout city with requests that they take them home, discuss various proposals with their parents and return leaflets to their teachers with items listed in order of importance, as viewed by parents, bring overwhelming response, more than 50,000 replies being received.

VOTE YES ON THE \$43,527,000 CITY BOND ISSUE

**It will help make jobs for all
It will help make St. Louis a better city**

GO TO YOUR POLLING PLACE ON AUGUST 1st

Voters of St. Louis will be asked on August 1, 1944, to authorize the issuance of \$43,527,000 in City Bonds to finance post-war improvements and public works projects.

The purpose of the fund, which will be raised by sale of Municipal Bonds to investors throughout the country, is to help provide jobs after the war is over.

1. CITY HOSPITALS AND INSTITUTIONS: Reconstruc-

tion or repair where needed to improve health facilities.

2. PARKS AND RECREATION: Provide more playgrounds and athletic fields for children, and the remainder for materials, which will be purchased locally as far as possible.

The following proposals to be voted upon separately August 1, 1944, in the Bond Districts, are as follows:

3. BRIDGES AND VIADUCTS: Reconstruc-

tion of Grand Avenue Viaduct; straighten MacArthur Street bridge.

4. FIRE PROTECTION: Build new engine houses where needed and make necessary repairs in present houses.

5. POLICE AND FIRE ALARM SYSTEM: Build and equip 8 new control stations; improve and extend present system.

6. SEWER SYSTEM: Protect health by completing River des Peres drainage project and replacing old, crumbling sewer lines.

7. STREET IMPROVEMENTS: Improve highways in important traffic arteries; improve man and personal transportation facilities in all sections.

8. MUNICIPAL 2000: Improve and expand present housing facilities to keep up with the demand in the United States.

9. AIRPORT EXPANSION: Enlarge and improve Lambert Field, locate and develop a second major airport.

10. CITY ART MUSEUM: Renovate, repair and improve the Art Museum Building.

11. WATER SYSTEM: Modernize the City's water supply to serve great expansion needs and make necessary improvements.

Remember the Date—August 1st

Vote YES on all ITEMS in the \$43,527,000 City Bond Issue

Each Item MUST be Voted SEPARATELY

CITIZENS' COMMITTEE ON POST-WAR IMPROVEMENTS AND EMPLOYMENT IN ST. LOUIS

As a citizen of St. Louis, we are sure you will be interested in reading the following brief discussion between Mr. Walter W. Head, Chairman of the Citizens' Committee on Post-War Improvements and Employment in St. Louis, relative to the \$43,527,000 City Bond Issue.

MR. HEAD: "Mr. Nease, as Comptroller of the City of St. Louis for many years, you have been responsible to a great degree for the financial condition of the City. You are well known among American cities for competence and careful handling of the public funds. I am sure, therefore, that St. Louis voters will be greatly impressed by your comments on the \$43,527,000 City Bond Issue which will be voted upon August 1st."

MR. NEASE: "I regard the 117th people's opinion as necessary in the coming election. I am sure that the voters of St. Louis will be providing needed municipal improvements and employment opportunities for the citizens of St. Louis. Based on past experience, I feel that these bonds will not increase taxes at all. St. Louis cannot afford to be a burden to itself."



Walter W. Head
Chairman, Citizens' Committee on Post-War Improvements and Employment in St. Louis

Catherine Pope 2016 Wisconsin ST. LOUIS OF TOMORROW

From time to time, every large city must take stock of itself and plan civic improvements to keep pace with the times. For example, in 1927, St. Louis instituted a series of improvements financed by the public through a special tax. We are looking forward to the New City of Tomorrow, the All-City Improvement Program.

It is again time for our City to plan and develop an intelligent, long-range program of public improvements, so that we may keep in step with national progress.

Such a program, to be paid for by another municipal bond issue, has already been developed by the Citizens' Committee on Post-War Improvements and Employment in St. Louis. We are looking forward to the New City of Tomorrow, the All-City Improvement Program.

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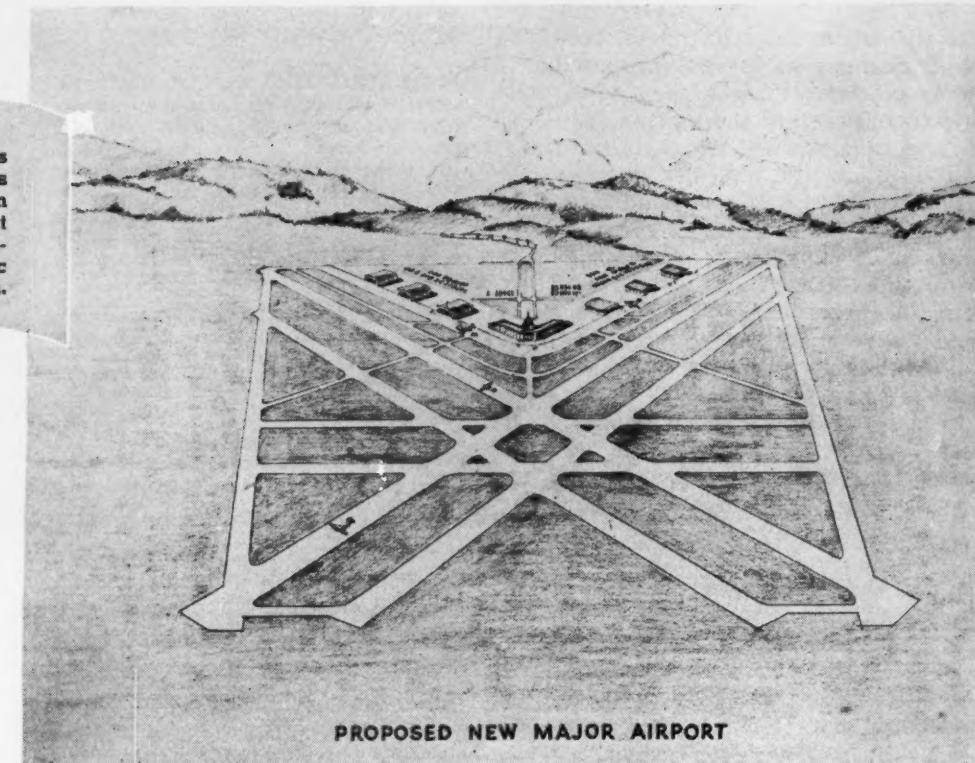
LARGE REPRODUCTIONS of architect's drawings showing proposed improvements to be financed by bond issue are placed on display at neighborhood centers throughout city, usually in conjunction with special meetings or exhibits designed to educate public regarding proposed public works program.

architectural talent which is available in St. Louis, in addition to the personnel on our payroll."

In fulfillment of this promise, the Citizens' Committee on Dec. 8 approved a list of 24 St. Louis architectural and engineering firms and assigned to them 35 projects totaling \$9,000,000. Other assignments were scheduled to be made before the first of the year.

Publicity Gets Results

Next to the two primary necessities of an alert, intelligent city administration and a large, truly representative, vigorous and civic-minded citizens committee, the greatest single factor contributing to the success of the program was the educational campaign conducted by the Publicity Committee under the aegis of the Citizens' Committee. Accompanying illustrations show some of the effective steps taken by the publicity committee to arouse and instruct the voters of the city.



PROPOSED NEW MAJOR AIRPORT

Publicity and display advertising pieces illustrated by accompanying reproductions were only part of the array of material and techniques utilized by the Publicity Committee in putting the needs of the city and the advantages of the proposed bond issue before the public. Even more important than these folders, leaflets and advertising displays were the

newspaper stories, public speeches, events, radio programs, moving picture trailers and articles in local periodicals and house organs. All of these activities combined to stimulate public interest and inform the voters regarding the wisdom of the bond issue as a permanent contribution to the future prosperity and health of the city and its inhabitants.

Pin-Up Girl STIRS MEMORIES OF OLD-TIMER



INSPIRED BY THE PORTRAIT of Miss

Frances Lindsey, Junior Aide, Alabama State Highway Department, published in the July, 1944 issue of *Construction Methods* as this journal's nominee for Road Builders' Pin-up Girl, L. R. Parmelee, civil engineer, Helena, Ark., has embodied his impressions in a communication, reproduced below, to J. Lawson Spear:

To J. Lawson (Oklahoma) Spear
Dear Slim:

For the sake of our association of nearly 40 years ago, I wish that you would casually observe the young lady (Miss Frances Lindsey) with the transit, on p. 65 of the July, 1944 issue of *CONSTRUCTION METHODS*. You will recall that during the

summer of 1905 you were a transitman on railroad location, and I was your back flagman. Notice the smile of this "transitman." I can not ever remember you posing—much less with your transit—and smiling, particularly during those late afternoons when we were 12 to 15 miles out of headquarters and no way in except by hand-car.

And the shoes, if they deserve the name! Notice the shoes of this person—but some ankles, Eh, Slim? I recall that your shoes were knee-high leather boots—all brass hooks and eyelets.

Take a look at the shapely legs and hips of this modern transitman. Don't they wow you? Your judgment about shapely legs and hips was good in 1905, but your legs and hips bore no resemblance to these—yours were long, a little knock-kneed and gangling. See the hands. Your hands, when at the hips, were reaching for a plug of tobacco or sometimes I was half reminded that you, in your Oklahoma way, were about

to pull a gun—you and William Faver sham in the "Squaw Man."

This "transitman" has a pretty waist too—I'll say. Yours, bulging with extra notebooks, paraphernalia for the field pocket tape, a wrapped-up lunch as big as a quarter bale of hay, was a sight. Yet you carried only about one-fourth of our total load. I, with my 5 ft. 6 in. and 140 lb., had the other three-fourths. Do you remember how my three-fourths was distributed? Extra chain around my neck, a bundle of stakes swung from each shoulder, extra hubs in my pockets, lunch, flag pole, and spare cutting tools. I had more to carry than one of our glorious paratroopers has now when he goes "out" for you and me.

I suppose you recall, too, when I fell off the old bridge into the Vermillion River trying to get a distance. I did not come up one time, much less three. You and Karl snaked me out. Then there was that row Karl and I had with the big

(Continued on page 134)



EACH OF TWO SLABS to replace old bridge span consists of seven 40-ft. long, 36-in. deep steel I-beams, here shown wrapped with wire to reinforce concrete in which they are to be incased.



BOTTOM FLANGES of I-beams are welded to 1-in. thick steel plates on which new span is rolled into position. Webs of these I-beams are bolted together at intervals.

STEPS IN THE REPLACEMENT of the span in an overpass on the main line of the Pennsylvania Railroad at Massillon, Ohio, are illustrated in the accompanying photographs. The old riveted steel structure of this 40-ft. overpass was ripped out and replaced with steel beams inserted in concrete. A major problem was to build the new span as completely as possible and to put it in place without impeding train movements. There are two tracks over the span and the job was done one-half at a time, so that railroad service could be maintained. Arc-welding, with Lincoln equipment, played an essential part in the operation.

Concrete abutments for the new span were built and in place underneath the tracks. Half of the old steel structure was ripped out and temporary wooden shoring was installed under the track beds. Two I-beam and concrete slabs

were built, one on each side of overpass.

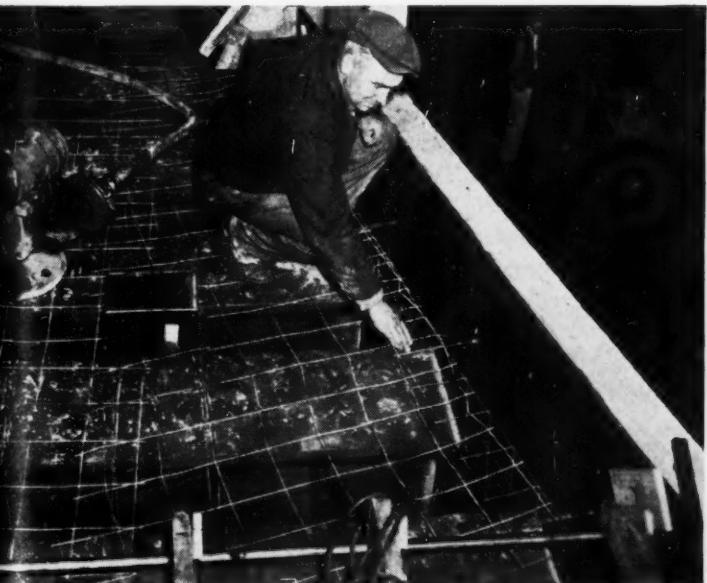
Each of these slabs consists of seven 40-ft. long, 36-in. deep, I-beams wrapped with reinforcing wire. Bottom flanges of the I-beams at each end are welded to 1-in. thick steel plates which make possible the rolling of the entire structure into place.

Welding also was used in connection with the job of holding the concrete forms in place around the I-beams. High-tensile, high-carbon steel rods were welded to the I-beams and these passed through the wooden forms to hold them securely in place. There was considerable load on the forms due to the mass of concrete they contained, and it required a strong rod and strong attachment to do the trick. The use of welding made this possible. The rods were fillet-welded for a length of about 2 in. with mild steel electrode.

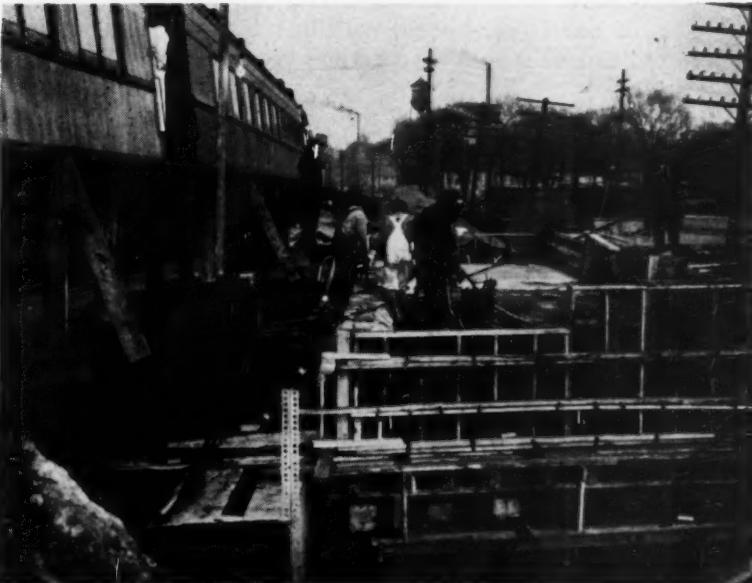
Arc Welding

Aids

Replacement of Railroad Span



FOR SUPPORTING WOOD FORMS prior to pouring concrete, steel rods are fillet welded to I-beams and pass through forms.



ONE OF THE TWO SPANS is here shown with pouring of concrete nearly completed prior to rolling unit into place.

REDEDICATION

An Obligation to Our Fighting Men

DURING the last few weeks we have been forcibly reminded that so long as we still are fighting either of our major foes, first claim upon the productive resources of the United States—its manpower, materials, utilities, and industrial facilities—must be the production and delivery of munitions and war supplies. All other claims are secondary. No responsible citizen would have it otherwise. For in this war even more is at stake than our existence as a Nation. We dare not forget that we are engaged in a struggle that challenges the fundamental values upon which our civilization has been built.

It is not easy to list the values that we are fighting to uphold. They have been clothed in a variety of shapes over the centuries. They will assume new forms in the years ahead. But they have an inner consistency that free men the world over can feel and recognize: the right of the commoner against the noble, the right of the individual against the state, the right of trial by jury, the right to vote, the right to an education, the right to freedom of speech and worship, the right to work in a sphere of one's own choosing, the dignity and the equality of the individual under the law—these are our cultural heritage, painfully won and often precariously held over the ages, always to be rewon, redefined and buttressed by each succeeding generation of men.

The preservation of this vital core of value, and its transmission to our sons and daughters depends upon our victory in this struggle. So those things which are essential to victory must come first. And since the production of war munitions in overwhelming volume and quality can hasten that victory and save countless lives of our fighting men, no effort that will contribute to this end should be regarded by us as a sacrifice.

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The present is no time for self-congratulation upon our achievements either in the theatres of battle or of production. The mounting casualty lists should suffice to curdle the savor of any such indulgence. The most that can be said in reasonable taste and good conscience is that performance in both fields is such as to warrant our firm confidence that we can carry to successful completion the tasks that remain to be done.

Nor is there profit in even observing, much less deplored, that the tasks ahead are more formidable than those which were defined for us a few short months ago.

Then, all of us—military leaders, government officials, workers, and business men—were riding a crest of optimism as to an early end of the war in Europe and as to the character and dimension of the war against Japan. Already we had begun to turn anxiously toward the problems of reconversion which then seemed so near at hand. Schedules for war production, based upon the best available estimates of need, called for a 5 billion dollar reduction from 1944 performance, even though we might have to continue a two-theatre war, and for a 40 percent reduction in the event of an early victory in Europe.

Today, those forward estimates have been revised sharply upward. That is true both of the 1945 requirements to meet the needs of a two-theatre war, and of requirements for the Pacific war once the European phase is ended. For this upward revision four chief reasons are responsible:

1. European battle experience has shown markedly greater use of expendable munitions than was provided in the formulae upon which our original production schedules were calculated: the result has been a depletion of inventories on a scale that would become dangerous if allowed to continue.
2. Experience has also demonstrated the need for new types of weapons or increased complements of some existing types to match new enemy equipment or tactics.
3. A less easy optimism as to the early ending of the European war has given rise to a growing disinclination to gamble on the approximate date.
4. An increasing conviction prevails that the war against Japan may require ground-army operations on the Asiatic mainland on a scale greater than originally premised.

But if these changes in the fortunes and outlook of war have raised our estimates of military requirements, may not subsequent favorable changes in the military situation cause them again to be revised downward? It is entirely possible. But our military men have learned that they cannot safely discount what *might desirably happen* as something that *will happen*. Those working on the production front also must learn that lesson. Fortunately, the record shows that we have been able to maintain a war production almost equal to that of the rest of the world combined, even while we produced for civilian use on a scale that has been large even by our

own pre-war standards. So we have ample margin to whip whatever war job may be required of us. As now defined, the task will not be easy. But it can and will be done.

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What, then, is the production task with which we are charged? Our 1945 production for the two-theatre war now calls for the substantial maintenance of the over-all levels reached in the latter months of 1944. But there is a shift of emphasis. Almost half of the programs for specific equipment items are declining. A few are scheduled to hold level. About 45 percent are scheduled to rise sharply. That means that workers and facilities must be shifted to man the expanding programs. At the same time the armed services are calling for many more men than can be supplied from those who become newly eligible to the 18 year old age group. That means further drafts upon war workers. It means also replacements for them when they are taken from the expanding programs. Finally, events demand that we produce as much as possible of many items during the first half of 1945.

Our task, then, is one of intensified effort for the immediate future, with multiple readjustments at a stage when adjustments are hard to make. Materials for which demand was easing as pipe-lines were being drained in anticipation of falling schedules again are tight as the pipe-lines are being refilled to meet augmented requirements. Men, women, and facilities must be shifted from less essential to more essential tasks. What must be done will be done. But unless there is much voluntary accommodation, it will be necessary for us to suffer a formidable amount of governmental direction which none of us likes, many of us deeply resent, and all of us, when personally affected, volubly protest. The more we police ourselves, the less we shall be policed.

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Even after Germany has been defeated, we shall still face a far from light production requirement to continue the war against Japan. As currently defined this phase might require war expenditures at something like \$70 billions a year, an over-all reduction of approximately 20 percent from the \$89 billions spent in 1944. Reduction in munitions output would be somewhat greater, probably from 25 percent to 30 percent below 1944 levels. But it is important for us to acknowledge that the reduction is going to be substantially less than the 40 percent previously estimated.

Only a few months ago there were those who questioned sharply the possibility that we might need 60 percent of current munitions output to win the Japanese war. Now the judgment of the military is that 70 percent will be none too high.

Actually the latter level would represent an increase of little more than 50 percent above what now is being produced for the Pacific area. This, certainly, is a modest estimate when we reflect that we shall inevitably more than triple the Army forces assigned to that theatre.

Such a program probably would give us a current munitions supply from three to four times that produced by Japan, but it is believed that we shall need that much to compensate for the advantages derived by Japan from the fact that she will be fighting a defensive war, from the volume of her accumulated stores, from her prepared positions, her shorter lines of supply and transport, and from her large troop reserves, the bulk of which we have yet to meet in battle. Certainly our present 3 to 1 production edge over Germany does not appear to be excessive.

The more modest V-E Day cuts contemplated by the present plan will mean a less acute reconversion problem when they are made, but will leave a greater one to be met at the end of the war. They will mean probably a net increase of not more than 4 million workers available for civilian work during the transition period. Their orderly absorption should present no embarrassing problem. Indeed, we now are warned by Washington that war production following V-E Day may require the protection of considerably closer control than was contemplated under the 40 percent cuts previously expected.

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In short, we face for the immediate future a more difficult production job. It is made the more formidable by the fact that we had dulled the keen edge of our will to produce by our premature expectation of a reduction in requirements. Now we are told that the trend of war production for the immediate future is up, that it is unsafe to discount the date of victory in Europe, and that the amount of leeway for reconversion after the defeat of Germany is less than had been anticipated.

Accordingly, we must rededicate ourselves to the task of driving war production up. We must do without some of the things that we have enjoyed on the civilian front rather than demand more of those things; we have still to devote our abilities and energies first and foremost to the demands of war.

Whatever will assure and hasten victory must have first place in any statement of American policy.

Without victory, our aims, and the underlying values upon which they are based, will be extinguished, blotted out by the opposing aims and values proclaimed by our enemies.

The needs of our fighting men must be put first. For, unless we win the war, the National aims and policies of the United States will cease to have meaning in the world.



President, McGraw-Hill Publishing Co., Inc.

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On any job, push or pull, Oliver's "Cletrac" controlled differential steering principle provides these outstanding advantages. Off-center loads are handled with ease. There's no need to "declutch" or

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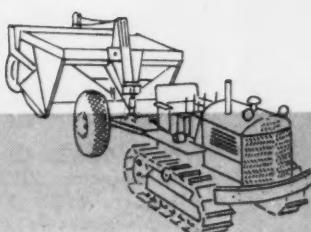
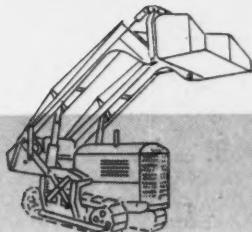
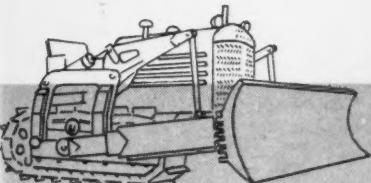
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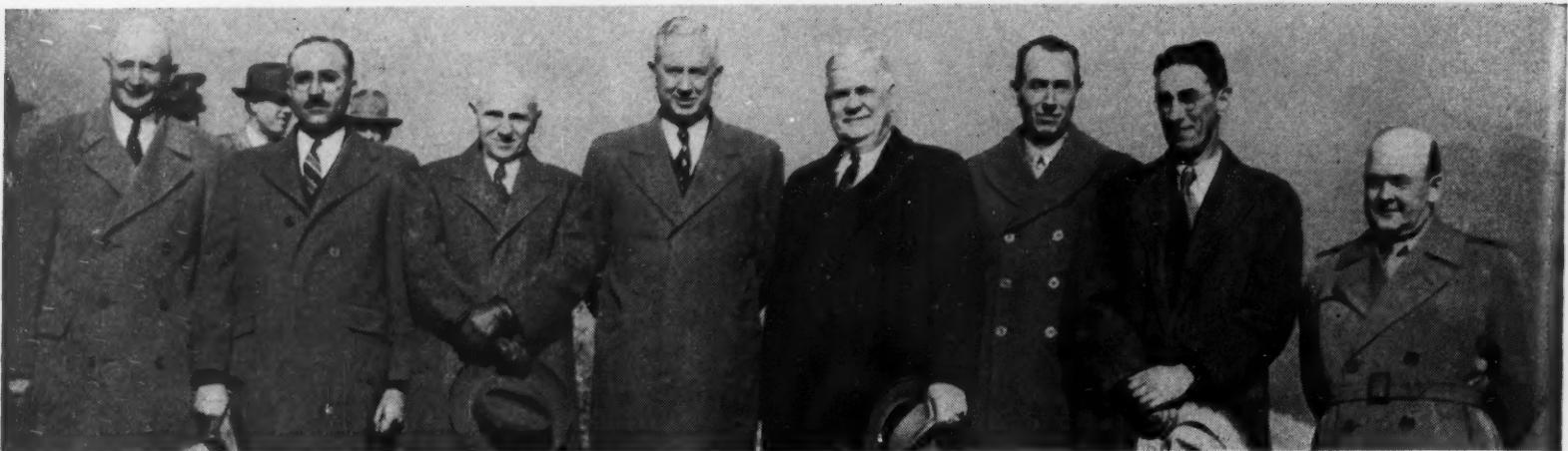
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Present and Accounted for...A PAGE OF PERSONALITIES



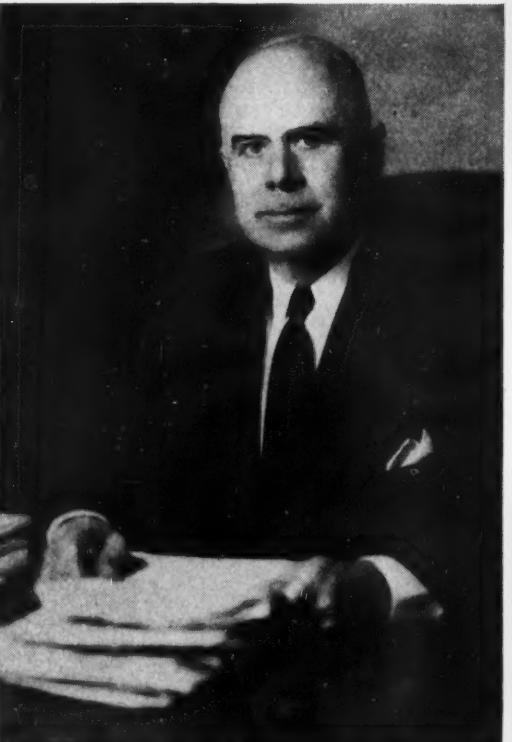
LARGEST HIGHWAY PROJECT in United States for 1944 is dedicated by Governor Edward Martin and Secretary of Highways John U. Shroyer of Pennsylvania Nov. 14 at ribbon-cutting ceremony opening 16½-mi. stretch of four-lane divided road on U. S. 22, William Penn Highway, east of Har-

tisburg. Present in group are (left to right): J. FOREST HEMPT, of Hempt Bros., Camp Hill, Pa., contractor for \$366,000 section; JAMES JULIAN, Wilmington, Del., \$403,000 contract; LOUIS DRUKER, of Union Building & Construction Co., Passaic, N. J., \$920,000 contract; GOVERNOR MARTIN;

SECRETARY OF HIGHWAY SHROYER; COL. E. H. TALIAFERRO, commanding officer at Indianola Gap Military Reservation; HARRY LUNDY, of Buffalo Gravel Corp., Harrisburg, \$717,000 contract; and BRIG. GEN. NORMAN RANDOLPH, commanding general Pennsylvania, 3rd Service Command.



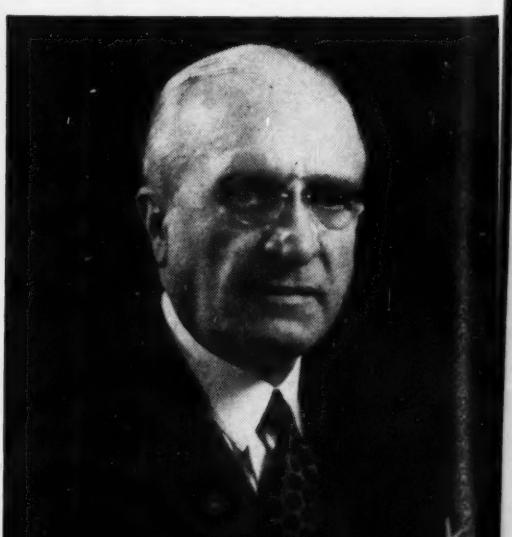
SEVENTY-FIFTH ANNIVERSARY is celebrated this year by George W. Rogers Construction Co., of New York, established in 1869 and now headed by its fourth president, GEORGE W. ROGERS (left), grandson of founder. Organization has specialized in construction of pile foundations, piers, docks, bulkheads, and other shipping facilities in and about New York Harbor and within area bounded by Boston, Albany and Philadelphia. Company's fleet comprises 18 units of floating equipment (derrick boats, work boats, tugs), in addition to land equipment of cranes, power shovels, compressors, etc. Among outstanding war projects completed in record time was 700-ft-long fitting-out pier for Bethlehem Steel Co. shipyard finished in 43 days and made subject of Navy citation.



APPOINTED CHIEF ENGINEER of New York City Board of Water Supply is ROGER W. ARMSTRONG (below), who first entered employ of board in 1906 as assistant engineer. He has served as engineer on 42-in. submarine pipeline between Brooklyn and Staten Island, on construction of City Tunnel No. 2 and on design of new Delaware water supply system. He succeeds Charles M. Clark, resigned.



CHIEF OF CONSTRUCTION in Office of Chief of Engineers in Washington, D. C., is BRIG. GEN. JOHN S. BRAGDON, who has general charge of all military construction activity in continental United States. He was formerly in command of South Atlantic Division of Atlanta, Ga.



DIRECTOR OF CONSTRUCTION BUREAU of War Production, Washington, D. C., Board is ARTHUR J. McCOMB (below), former vice-president of Otis Elevator Co.



FOR 25 YEARS OF SERVICE as head of federal road agencies, THOMAS H. MACDONALD, commissioner, Public Roads Administration, receives special certificate from American Association of State Highway Officials at annual meeting, Nov. 27-30.

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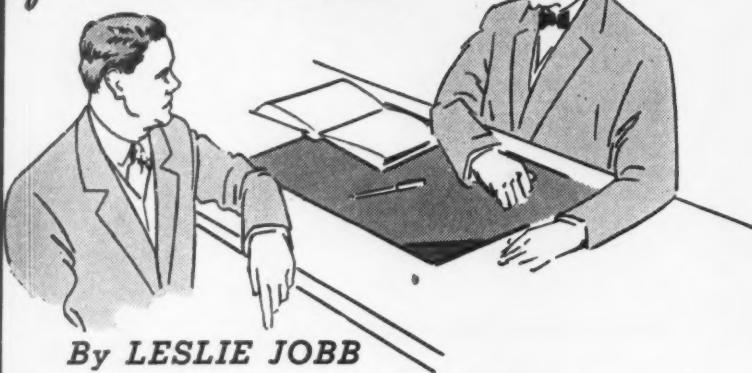
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LEGAL ADVENTURES

of TRACTOR CONN



By LESLIE JOBB

No contractor ever tries to be his own dentist or his own shoemaker. It is even more dangerous for him to be his own lawyer. There are, however, some legal rules which every contractor should know, and these rules may be explained in plain English without resorting to the jargon of the law, unintelligible to most laymen.

This series of articles, dealing with the Legal Adventures of Tractor Conn, a typical contractor anywhere in the United States, explains some of these legal points in plain language for the contractor. Each one is based on an actual decision of an American Court.

The Case of the Verbal Notice



"Provided, however, that this contract may be cancelled at any time upon written notice by the architect to the contractor," a certain building contract specified. Tractor Conn placed the required machinery on the ground, employed the necessary workmen, and was ready to start operations.

"You're wanted on the telephone," somebody told him. Conn went to the telephone in the temporary office he had fitted up, and found the architect at the other end of the line.

"Your contract is cancelled and rescinded according to section seven," the architect told him.

"You're the boss," Conn admitted and called his foreman.

"The jig's all up here—contract rescinded," he explained. "Move the plant and crew down to the dock contract."

On the way to the new contract Conn stopped at his lawyer's office, showed him the contract, and instructed him to sue for damages.

"According to this contract the owner had the right to cancel it at any time," the lawyer pointed out.

"Yes, but it wasn't cancelled according to the contract. The contract said notice in writing. All I got was a telephone call."

"Where's your machinery and crew?"

"I moved them to the new job at the dock and they're at work by this time."

The lawyer handed back the contract. "No case," he declared.

"Why not?"

"Because, although you were entitled to written notice, when you acted on the verbal notice, pulled up stakes and

abandoned the contract, you thereby waived the right to insist on written notice."

And this opinion was good law, according to the decision of the Court of Claims in the case of Kennedy vs U. S. 24 Ot. Cl. 122.

The Case of the Surety Bond



Tractor Conn bid on a city contract and his bid was accepted.

"You will have to furnish the bond of a surety company to guarantee performance of your contract according to the terms of your bid," the city pointed out. Conn furnished the bond, did part of the work, and received the proportionate payments specified in the contract.

While Tractor Conn was still carrying on his contract, he borrowed money from the bank and gave the bank an order for an assignment of the payments still due him under the contract. The city accepted the assignment, and paid the money then due to the bank.

Then Conn "turned up missing" one morning and the surety company which had issued his bond completed the work.

"The money that you paid the bank was really a deferred payment or a retained percentage under the contract and we're entitled to the benefit of it," the surety company contended.

"At the time we approved the assignment the money was actually due to Conn. There had been no default at the time we made the payment and we cannot be compelled to pay twice," the city contended. The Kansas Supreme Court ruled that the city was right in the case of the United States Guaranty Company vs Pittsburgh, reported in 225 Pacific Reporter, 83.

The Case of the Absconding Subcontractor

Tractor Conn sublet part of the contract for the Popular Factory. The subcontractor absconded, the auditor went over his books, and found a shortage of \$10,000.

"Luckily, I've got a \$15,000 fidelity bond from the Midland Surety Company," Conn stated.

"Better look it over and see that everything's in proper order," the auditor suggested.



Tractor Conn got out the policy and glanced over it.

"Looks all right," he said.

"There's generally a clause in those policies that if the premium is not paid in 60 days the policy becomes void."

"There is in this one."

"Is your premium paid?" the auditor questioned.

"It's not, and the 60 days expired several weeks ago," Conn admitted.

"Well, I'm an auditor, not an insurance lawyer, but I'd suggest that you send the company a check for the premium, get them to accept it, and take your chances on the policy," the auditor advised.

Tractor Conn acted on this advice, and the United States Circuit Court of Appeals in a case reported in 293 Federal Reporter, 377, ruled in his favor.

"Receipt of the premium after the date would be such a waiver of the time of payment as to bind the company for the breaches occurring prior to such receipt," said the Court.

**More Legal Adventures of
Tractor Conn Next Month**

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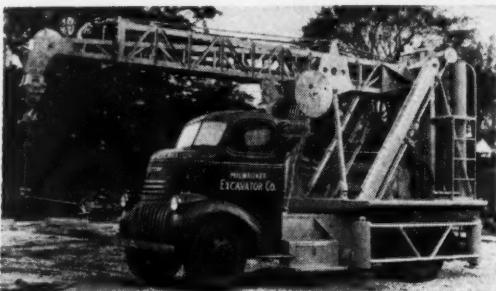
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CONSTRUCTION EQUIPMENT NEWS

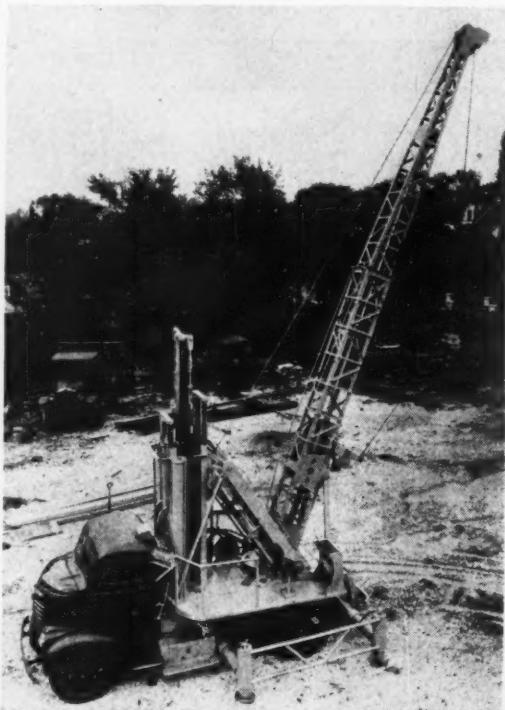
FEBRUARY, 1945 REVIEW of Construction Machinery and Materials

ALL-HYDRAULIC TRUCK CRANE. 6-ton capacity, operated without drum, gear, clutch brake or separate power plant, is now ready for commercial production. Mounted on standard 1½-ton short wheelbase truck, entire load, while operating, is carried on hydraulic-controlled outriggers. Unit has full-circle swing, a live boom telescopic under load and a single load line with maximum run of 52 ft. All movements, except travel, carried on independently or simultaneously. When set for travel, rig is 8 ft. wide, 11½ ft. high and 24 ft. long. Operates by series of single-acting hydraulic rams with oil pressure supplied by three small hydraulic pumps V-belt driven from truck drive shaft, truck engine idling at 1,200 rpm, providing ample pressure through pumps for full-capacity operation. Outriggers consist of two horizontal pipe cross-arms 6 ft. apart and extending to



two rams and cables acting on lower, or seat end, and not through tip of boom as is customary. Load line, $\frac{5}{8}$ in. dia., handled by two vertical rams at back of top frame operating through series of sheaves. Hoist line speed, 20 ft. per min. Upper frame revolves at 3 rpm. around kingpin on four rollers. Swinging accomplished by two rams acting on cables wrapped in opposite directions around a non-revolving horizontal spool fixed to top of kingpin. Additional feature: set of hydraulic controls mounted on top of truck cab for running and steering truck without necessity of entering truck cab. Crane all-welded, fabricated completely from plate, shapes and without a single casting. Roy Billings is inventor of machine and will manufacture under name of Milwaukee Hydraulic, Inc., 1645 S. 83rd St., Milwaukee, Wis. General distribution through Milwaukee Truck Crane Co., 30 North La Salle St., Chicago, Ill.

★ ★ ★



maximum of 11 ft., each inclosing extension pipes that are pushed outwards by rams. Ram-activated pedestals may be operated independently to level crane on uneven ground. Boom consists of one all-welded box frame sliding within another, length being varied from 19 to 31 ft. under load by single long ram. Boom raised and lowered by

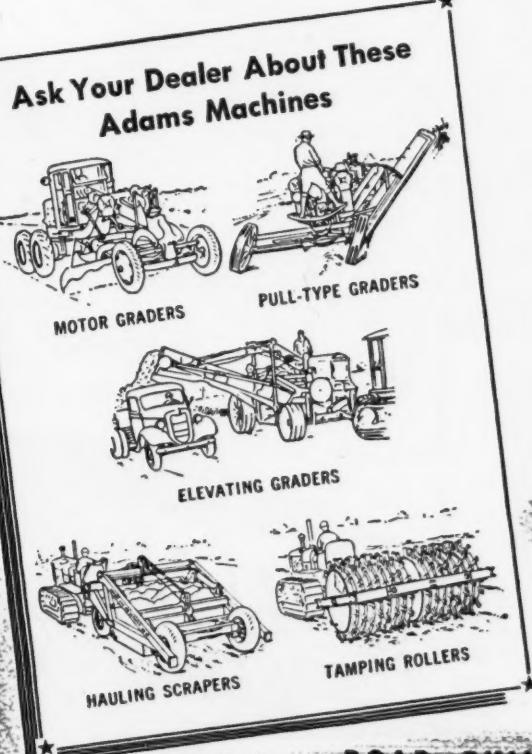


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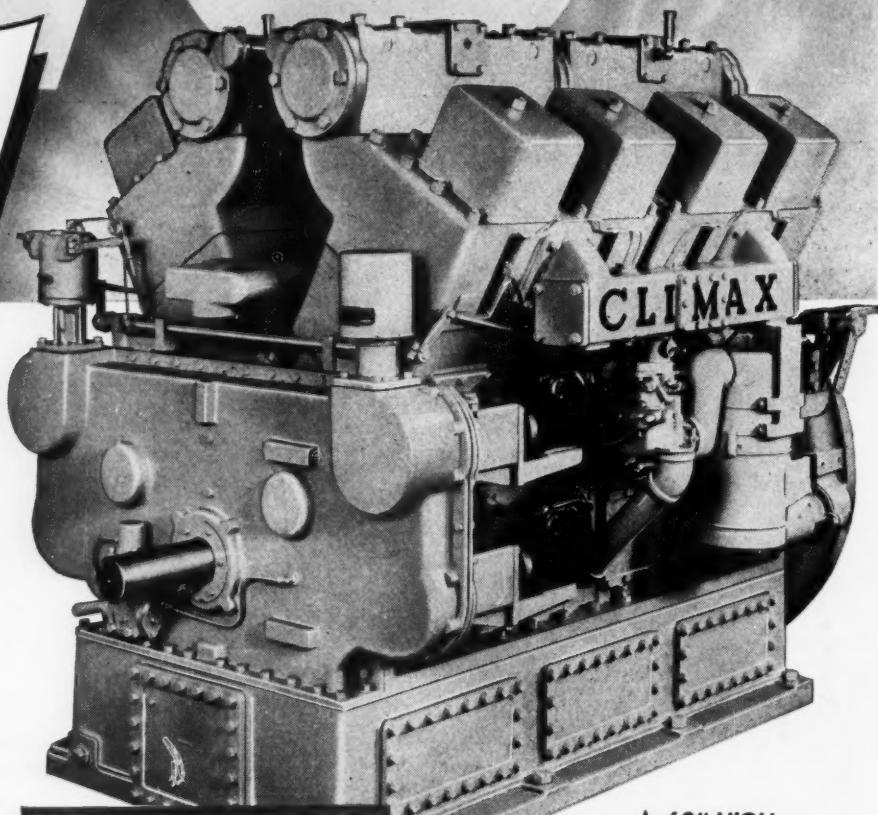
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DUMP CONTROL

Tackles the work of ten men—Does the job faster, cheaper! Saves dollars and precious man hours! Loads sand, gravel or dirt at rate of 40 to 60 yards an hour! Used also for scraping, leveling, grading! No idle time with this ever-useful, much-needed equipment. Its ease and speed of operation, even in close quarters, make it a real time and money saver in every type of road or construction work.

THE LOW COST LOADER THAT HANDLES BIG JOBS!

Big $\frac{1}{2}$ yard scoop handles 1500 to 2000 pounds of gravel, sand or dirt per scoop . . . does it easily, smoothly. Lifts load 8 feet. Dumps load at any height. Positive action from power take-off! Operator has perfect control. Unit built to give a lifetime of service-free operation. Dependability, economy and satisfaction proved on hundreds of big construction and maintenance jobs.

NOW AVAILABLE . . . A limited number of these famous loaders available for the first time in two years. Write for illustrated literature and prices.

Automatic EQUIPMENT MFG. CO.
501 MAIN ST. Pender, Nebr.



TRACTOR LOADER

Attaches to ANY
TRICYCLE TRACTOR

Now STANDARD EQUIPMENT for ROAD BUILDERS and CONTRACTORS

HERE ARE JUST A FEW BIG USERS:

HARGROVE CONST. CO.
Grand Island, Nebr.
PETER KIEWITT & SONS
Omaha, Nebr.
JOHN KELLY CONST. CO.
Fairbanks, Ind.
STATE OF NEBRASKA, DEPT.
OF ROADS AND IRRIGATION
SAND ORE CONST. CO.
McPherson, Kans.

You Too Should Have an Automatic on the Job on EVERY LOCATION!

ing extended its use to numerous fields. Free-spooling drum pays out line more smoothly at any speed without jams or snarls. Permits one-man operation. Hand lever at right rear actuates sliding internal gear clutch on cable drum shaft, disengaging drum and permitting free spooling. All castings are made of Carcometal, a patented alloy steel said to possess an elastic strength of almost twice that of ordinary cast steel plus toughness required for continuous heavy service. Sealed one-piece case protects gears, shafts and bearings against destructive grit and dust. Keeps oil lubrication enabling all gears to run in continuous oil bath. Cable drum size: barrel diameter, 6 in.; flange diameter 15 in.; barrel length, 11½ in. Cable capacity: $\frac{3}{4}$ in., 252 ft.; $\frac{5}{8}$ in., 365 ft.; $\frac{9}{16}$ in., 450 ft.; $\frac{1}{2}$ in., 570 ft. Line pull in pounds at speed in feet per minute based on 41 belt hp. at 1,400 rpm.: Overwind, bare drum, 17,700 lb. at 76½ fpm.; full drum, 8,000 lb. at 169 fpm. Underwind, bare drum, 12,600 lb. at 107 fpm.; full drum, 5,700 lb. at 237 fpm.—Pacific Car and Foundry Co., Renton, Wash.

★ ★ ★

BACKFILL TAMPER is recommended to contractors by its makers because of its smooth holding characteristics, the ease with which it can be "walked" over the fill and because there is no tendency toward freezing of valve or exhaust when operations are carried on in cold, damp weather. Other features: (1) Ample integral oil reservoir feeds only when tamper is in operation, assuring complete lubrication; (2) burnished cylinder bore is highly resis-



BROWNHOIST BUCKETS

Designed and built by Industrial Brownhoist Corp. do a better job because, 1) Large Sheaves reduce rope wear, 2) Heavy Carbon - Steel digging lips take deep, clean bites, 3) Extra-sturdy construction insures long life. Write for complete facts to Industrial Brownhoist Corporation, Bay City, Michigan. Offices in New York, Philadelphia Cleveland and Chicago.

BROWNHOIST BUILDS BETTER BUCKETS

tant to wear; (3) low-lift, end-seating valve sustains efficiency of piston action over long period of time; (4) front head of cylinder compresses piston rod packing as it is screwed on cylinder and when correct compression of packing is reached, locking pin is dropped in place and retained by snap ring; (5) double taper locking feature of tamping pad attachment holds pad securely on piston rod against all shock and vibration. Cylinder bore, 1½ in.; length overall, 47¾ in.; net weight, 34 lb.; air inlet, $\frac{3}{4}$ in.; diameter of pad, 5¾ in.; weight of pad, 5½ lb., shipping weight, 56 lb.—Gardner-Denver Co., Quincy, Ill.

Build better MOUNTAIN ROADS

with AGGREGATE from a
CEDARAPIDS MASTER TANDEM

When the ban on building general highways is lifted, you will get your opportunity to help build postwar prosperity. Then a Cedarapids plant that is flexible enough to meet so many requirements will put you in the most favorable position for bidding on contracts. Take the Master Tandem, for instance, with its maximum production of uniform, graded products which can economically meet a variety of modern specifications. It delivers greater tonnage in less time, with more hours of trouble-free operation and at less cost, because it has ALL the features to meet these requirements. In the Master Tandem, Cedarapids again demonstrates its leadership in the aggregate and asphalt plant equipment industry.

IOWA MANUFACTURING COMPANY
CEDAR RAPIDS, IOWA



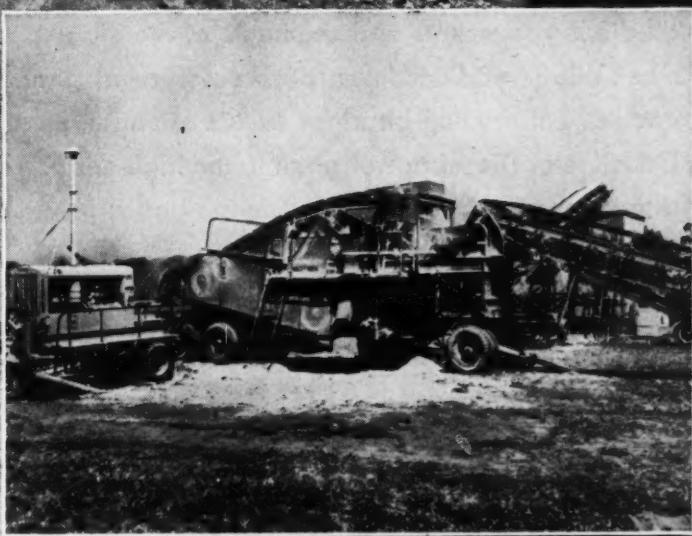
Cedarapids

Built by
IOWA

THE IOWA LINE

of Material Handling Equipment
Includes

ROCK AND GRAVEL CRUSHERS
BELT CONVEYORS—STEEL BINS
BUCKET ELEVATORS
VIBRATOR AND REVOLVING
SCREENS
STRAIGHT LINE ROCK AND
GRAVEL PLANTS
FEEDERS—TRAPS
PORTABLE POWER CONVEYORS
PORTABLE STONE PLANTS
PORTABLE GRAVEL PLANTS
REDUCTION CRUSHERS
BATCH TYPE ASPHALT PLANTS
TRAVELING (ROAD MIX)
PLANTS
DRAG SCRAPER TANKS
WASHING PLANTS
TRACTOR-CRUSHER PLANTS
STEEL TRUCKS AND TRAILERS
KUBIT IMPACT BREAKERS



"CLEVELAND'S"

Extra Ruggedness and Power to Spare



**Enable Them To Take
the Toughest Trenching
Jobs In Stride . . .**

The numerous crawler and wheel speed combination at the operator's command, in "CLEVELANDS", permit the application of tremendous power to the digging wheel when excavating through rocks and boulders as indicated in the illustration to left.



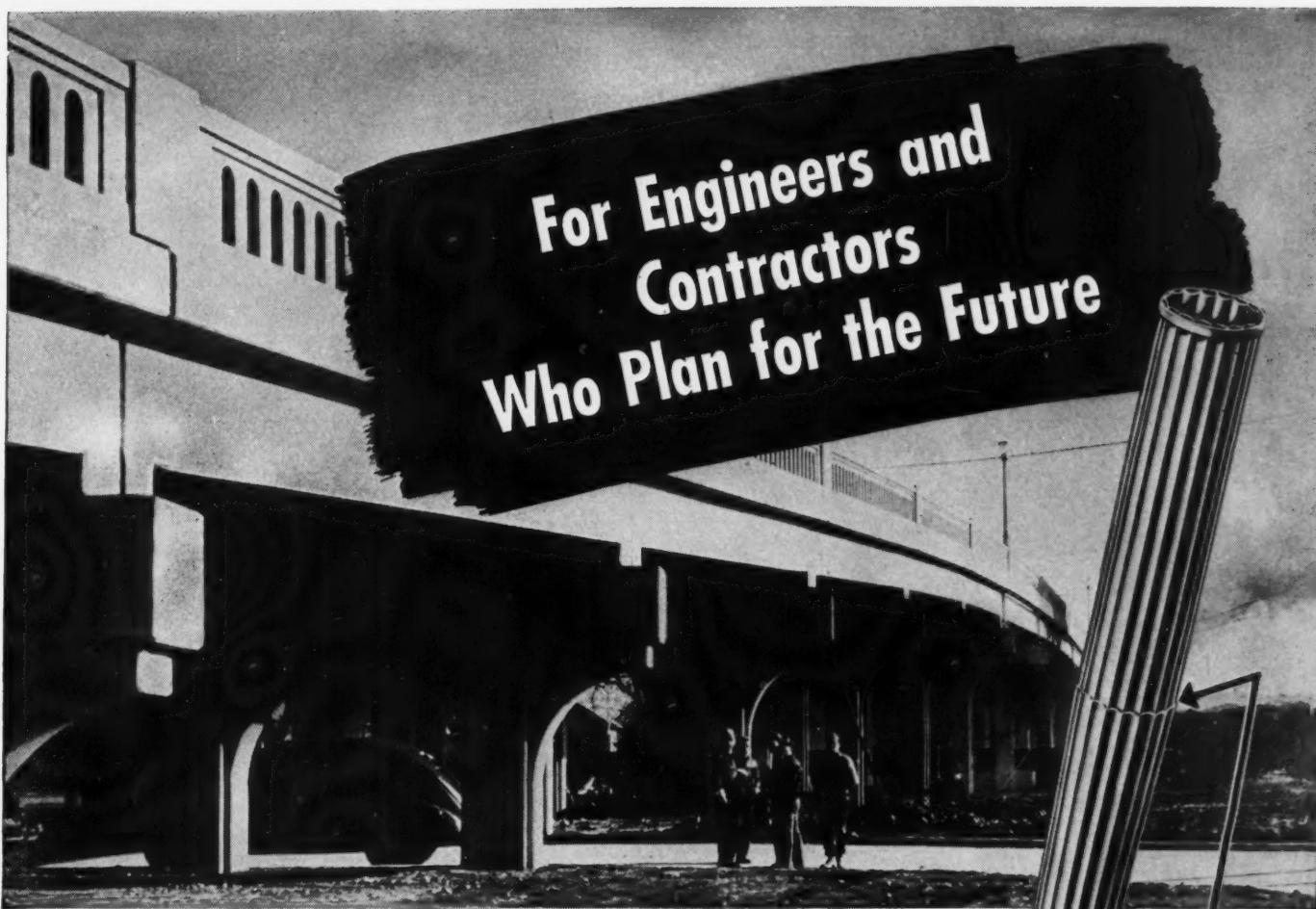
The picture at right shows a "CLEVELAND" digging through a frozen creek bottom and up a bank without a hitch, while digging at maximum depth. Such performance requires real ruggedness.

● "CLEVELAND" appreciating that of all construction equipment none must meet tougher assignments than the trencher designs and conditions its machines to meet the roughest going in any kind of soil or terrain. For instance; in "CLEVELANDS" double-strength steel is normally used in frame, boom and buckets and the toughest, longest wearing materials are used throughout—all driving sprockets and segments of the digging wheel are of heat-treated drop forged alloy steel. Wide tread and low ground pressure, all gears in grease sealed housing and a preponderance of anti-friction bearings assure strength, endurance and stability. In fact, from the husky Gasoline or Diesel power plant to the high-capacity digging wheel you will find in CLEVELAND a toughness, a freedom from friction and a protection from wear to an unsurpassed degree.



**THE CLEVELAND
TRENCHER CO.**

20100 St. Clair Avenue • Cleveland 17, Ohio



THESE four special Monotube features will make the installation of piled foundations for bridges, highway overpasses, marine construction, airports, and large buildings easier than before:

- ✓ **HANDLING**
- ✓ **DRIVING**
- ✓ **EXTENSION**
- ✓ **INSPECTION**

Monotube lightness, makes for fast, economical, easy handling.

Monotube tapered fluted construction, combined with great structural strength, permits faster driving—without heavy core or mandrel.

Extendible Monotubes can be quickly and easily extended on the job to meet the requirements of varying soil conditions.

Monotube tubular design permits fast, sure inspection prior to concreting.

Speed your first postwar project . . . make your work easier, more profitable with Monotubes. Available in a gauge, size, and taper to meet all your needs. Send for Catalog 68A. The Union Metal Manufacturing Company, Canton 5, Ohio.



HOW MONOTUBES ARE EXTENDED ON THE JOB



UNION METAL
Monotube Tapered Piles



Nitro Starch Base

HIGH EXPLOSIVE EFFICIENCY

IN MINING • QUARRYING • LOGGING • CONSTRUCTION

Plus THREE ADVANTAGES FOR YOU!

- 1 WILL NOT PRODUCE HEADACHES from handling... reduces discomfort from breathing muck pile fumes. Better working conditions for you and your men!
- 2 WILL NOT FREEZE or leak at Arctic or Tropic temperatures. Maintained high efficiency... anywhere... anytime!
- 3 WITHSTANDS IMPACT in high-powered Rifle Bullet Test. Greater safety for workers!



TROJAN POWDER COMPANY

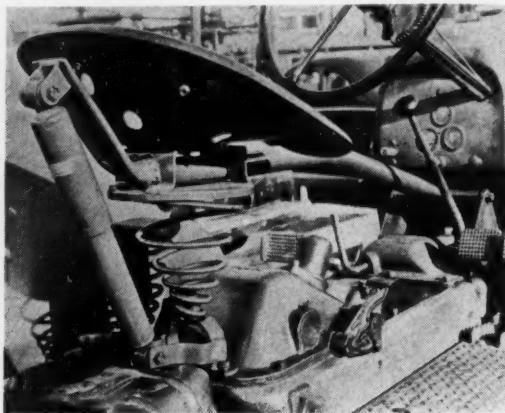
One of America's Oldest High Explosives Manufacturers

PLANTS: SEIPLE, PA. • ROBERT, CAL. • MAGAZINES STRATEGICALLY LOCATED THROUGHOUT THE NATION

OFFICES: ALLENTOWN, PA. • SAN FRANCISCO, CAL. • LOS ANGELES, CAL. • PORTLAND, ORE. • NEW YORK, N. Y.

NEW SEATS FOR ROAD-BUILDING EQUIPMENT

providing greater comfort and stamina for operators will be available after the war by the use of a new principle in seating which has been worked out successfully for farm tractors. These seats invented by the Monroe Auto Equipment Co., Monroe, Mich., utilize a special variable rate



spring which reacts equally to light- or heavy-weight operators. Double-action hydraulic shock absorber resists down and up action of spring, assuring level ride regardless of roughness of terrain. Stabilizer bar prevents side sway. Use of these seats on road-building equipment is expected to increase work capacity of operators, to reduce predisposition to kidney and skeletal ailments and to lower number of accidents by assuring complete control of machine by driver.—Monroe Auto Equipment Co., Monroe, Mich.

★ ★ ★

RUST PREVENTIVE 5, a by-product of the process of refining motor oils and consisting of wax concentrates in solution with petroleum solvents, is now in use in a great number of Army processing depots throughout the country as well as in industrial plants where rust is a problem. Reasons for its widespread use, as given by the manufacturer are: (1) Dries in less than 1 hr.; (2) has excellent water repellent characteristics; (3) satisfactorily resists salt water corrosion and humidity; (4) easily applied by brush, spray or dipping; (5) easily removed by any petroleum solvent or kerosene.—Kendall Refining Co., Bradford, Pa.

★ ★ ★

1/2-YD. SHOVEL, convertible to crane, dragline or pullshovel, is available as a cruiser crane mounted on rubber tires and also can be furnished for truck mounting. Improvements: same boom for



shovel or pull shovel operation; trigger-fast dipper trip; independent unit traction gear case; easily removable machinery units; instant travel reverse; spacious walk-around area; headroom in all parts of the cab.—Koehring Co., Milwaukee 10, Wis.

P&H



Expect These Things From P&H

SMOOTH PERFORMANCE. From smooth-rolling crawlers, operating on the true roller-chain principle, to boom point sheave...in every detail of design, these P&H's are built to reduce friction and eliminate strain.

EASY OPERATION. Smooth, responsive hydraulic control. Here's swift, velvety action that is easier on the machine, easier on the operator.

LONG LIFE. All-welded construction of rolled-alloy steels... more rigid, more rugged. No bolts or rivets to work loose or shear; no "weaving" to let machinery get out of alignment. It means fewer repair bills, too.

ADDED VALUE. Many of P&H's exclusive refinements might have been withheld. But they are included be-

cause they save you time and money in the long run. P&H's added values protect your investment in excavating equipment. Ask for the proof!

General Offices:
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P&H Excavators are built in sizes up to 6 cubic yards capacity with gasoline, Diesel or electric power. Write for literature.

P & H EXCAVATORS
HARNISCHFEGER CORPORATION
EXCAVATORS • ELECTRIC CRANES • ARG WELDERS • ROISTS • WELDING ELECTRODES • MOTORS



Try Cleco Riveters on your job, and you will soon find them superior in three important ways:

1. LESS FATIGUING. The tubular air-thrown valve insures smooth action, while vibration and recoil are reduced by the plunger cushion in the valve block. Note the 3 handle styles at right, all well fitted to the hand, and free of lugs, etc.

2. MORE POWER. In the large reservoir, surrounding the valve block, air is stored and pressure built up between blows. Thus air is impacted in volume on the piston at each stroke, greatly increasing the power of the blow.

3. GREATER STRENGTH. Handle is drop forged, heat treated for strength and resistance to fatigue stresses. Cylinder is of alloy steel, hardened and ground to perfect size and surface. Honing adds to the life of interior surfaces, insures lasting efficiency.

Bulletin 82 describes Cleco Riveting Hammers in detail. Ask for it!

*Speed Final Victory!
Buy More U. S. War Bonds!*

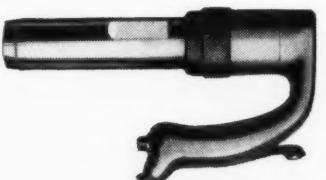
HEAVY DUTY RIVETERS 3 HANDLE STYLES



Style AO



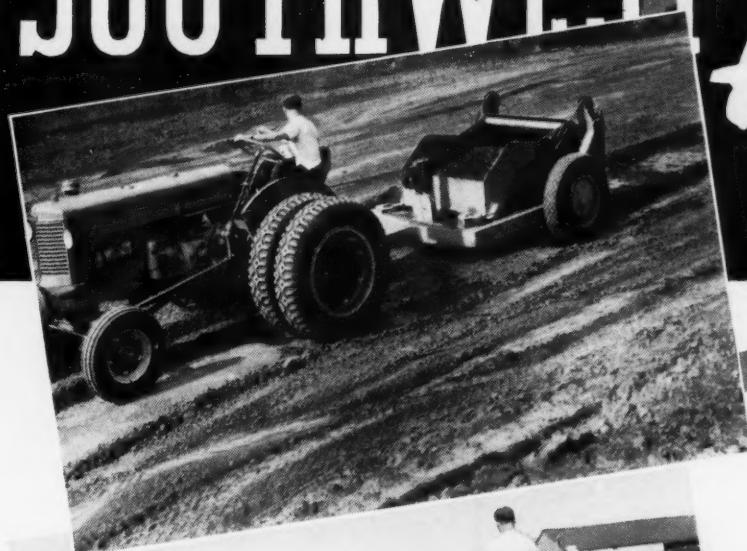
Style AG



Style AP

THE CLEVELAND PNEUMATIC TOOL CO.
3781 EAST 77th STREET • CLEVELAND 5, OHIO
Branch Offices in All Principal Cities

SOUTHWEST



Hauling Scoop

... With Standard Rubber Tired Tractor . . . Ideal Combination For Maintenance And Repair

Our Highways and rural roads, overtaxed by wartime traffic, are badly in need of repair. Maintenance equipment is being utilized to the fullest extent—but requirements are continually increasing.

Modern Earth Moving methods call for speedy, economical equipment—units with all-round efficiency on every job.

Southwest proudly presents this latest development in the use of its **Single Cable Controlled Rear Dump Hauling Scoop**. Equally desirable for both on and off-highway operation where the **material** (not confined merely to earth moving) must be loaded, transported, and dumped in a heap or spread evenly. Elimination of extra equipment—reduction in manpower requirements—and lower investment are just a few reasons why it will pay you to put this combination in your equipment set-up. Write for full details.



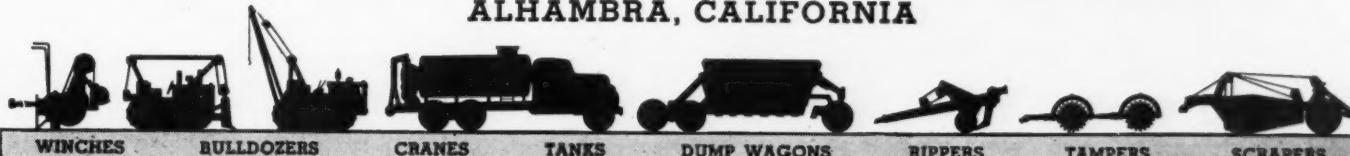
Four page bulletin available on request. Gives engineering data on the three standard sizes of Southwest Hauling Scoops. Write Department A293, Southwest Welding & Manufacturing Company, Alhambra, California.

... Easy Loading . . . Fast Hauling . . . Controlled Spreading . . .

CONSTRUCTION MACHINERY DIVISION

Southwest Welding & Manufacturing Co.

ALHAMBRA, CALIFORNIA



WINCHES

BULLDOZERS

CRANES

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DUMP WAGONS

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SCRAPERS

GET TOUGH HARDNESS *with* MIR-O-COL HARD FACING



USE MIR-O-COL METALS TO HARD-FACE

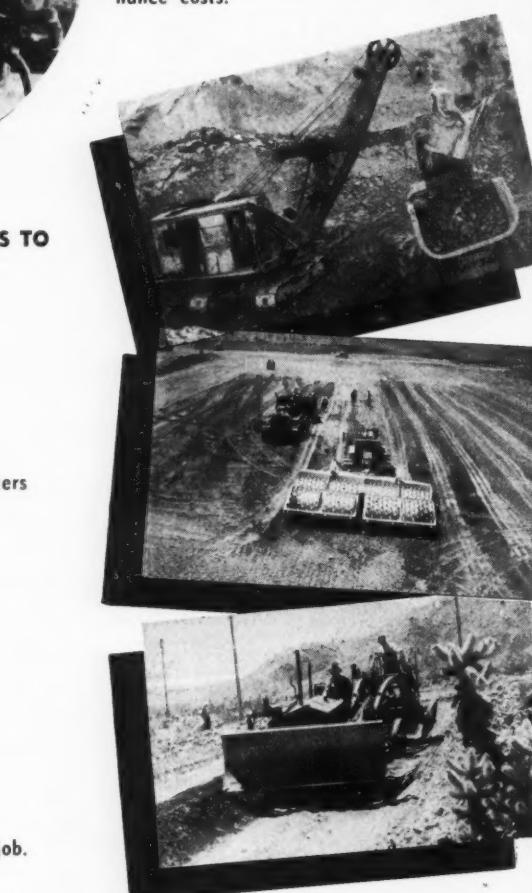
All kinds of bucket lips
Traction treads
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Ditcher teeth
Road scraper blades
Scarifier teeth
Road plows
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This means more profit per job.

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PLASTIC GOGGLE, known as Amcoweld Plastic Goggle, is claimed to provide undisturbed and unrestricted vision coupled with maximum protection against impact hazards. Made of one piece clear Plexiglas which has the same qualities as the finest optical glass, permitting goggles made



with it to be worn all day without eye strain or fatigue. Lens area extends in an unbroken curve from temple to temple without corners or sharp bends. Added to this feature is absence of rivets, bars or seams, resulting in uninterrupted and unrestricted vision. Goggles are spatter resistant, light in weight and because of smoothly rolled edges and $\frac{3}{4}$ -in.-wide full elastic headbands, comfortable to wear.—**Eastern Equipment Co., Inc.**, Willow Grove, Pa.



FREE Booklet for Expediting Daily Shopwork!

TODAY more than ever it will pay you to investigate EVERY available time-saving short cut that will help you speed up such urgent tasks as degreasing repair parts, cleaning motors and chassis, reconditioning clogged radiators, cleaning cooling systems, preparing equipment for repainting.

And one worthwhile source of information that describes performance proved ways to expedite these and many other essential jobs is the new Oakite Automotive Service Manual . . . 36 pages of valuable data. Your copy, FREE for the asking, will be sent postpaid on request. Write TODAY!

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OAKITE
Specialized CLEANING
MATERIALS & METHODS FOR EVERY CLEANING JOB

Preformed *wire rope*

SAVES TIME 3 WAYS

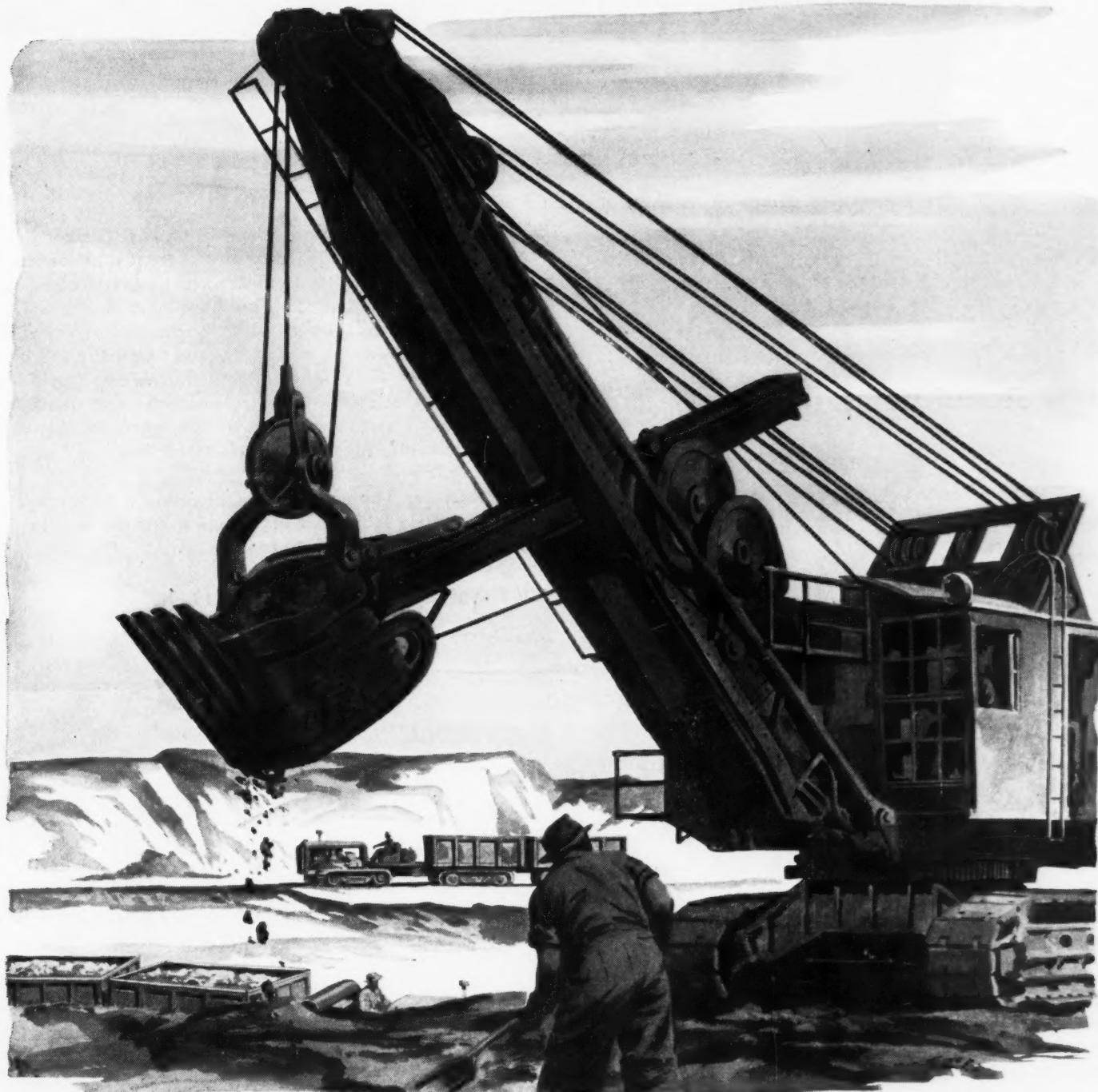
Men in every industry are changing to Preformed wire rope because they have discovered it saves time in three important ways.

First, it cuts time of installation at least in half because it is so easy to handle, so free from kinking.

Second, Preformed saves time in operations. It is so flexible it can be spooled at higher speeds. Third, it reduces time-out for shutdowns and replacements because it lasts longer.

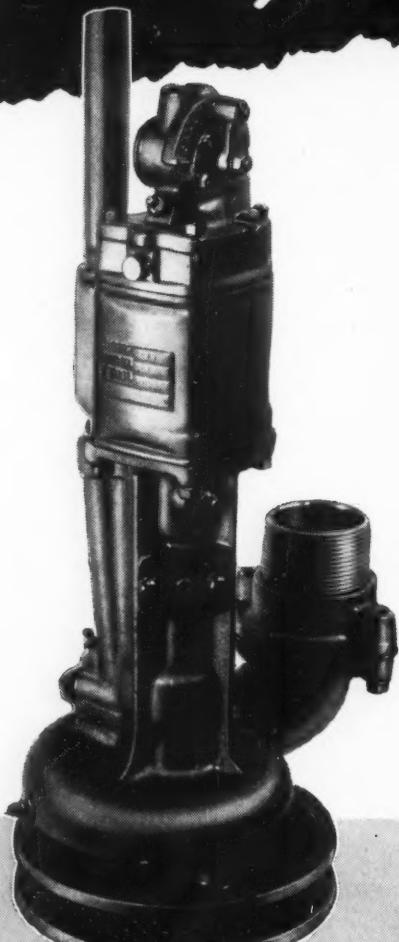
These are potent reasons why men searching for new ways to save time prefer Preformed wire rope.

ASK YOUR OWN SUPPLIER FOR PREFORMED WIRE ROPE



A *Thor* Team That Will Do a Better Job

Thor SUMP PUMP



Thor automatically lubricated sump pumps are designed and manufactured to operate most efficiently on the toughest jobs under the most severe, most unfavorable conditions. The Thor rotary air motor is enclosed in an air-tight, fool proof housing to assure steady operation whether partially or fully submerged. Because they are self-priming, centrifugal impeller type pumps. Thor sump pumps will operate in the dirtiest of water—in oil—in sludge or in sewerage, at peak efficiency. The variable speed throttle controls capacity and speed.

Thor Sump Pumps have a newly designed exhaust outlet feature which eliminates, (or in damp climate minimizes), shut-downs due to freezing.

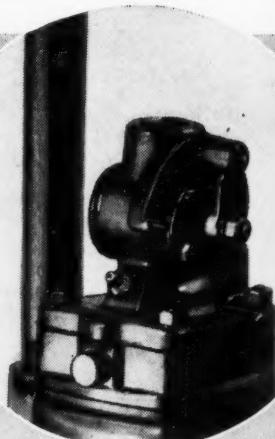
The exclusive Thor automatic lubrication system keeps all moving parts adequately lubricated at all times. For the best in sump pumps call your nearby Thor distributor today.

AUTOMATIC LUBRICATION

Live air pressure provides continuous application of grease to the impeller hub and bushing. The oil is fed from a built-in oil reservoir to the rotor blades and the cylinder bushings in a fine continuous spray.

VARIABLE SPEED CONTROL

The Thor variable speed throttle accurately controls the speed and capacity of the pump. This is a hand lever that can be set to pump many gallons per minute, or to idling speed where it pumps slowly.



It Will Help Contractors Your Job Easier!

Thor PAVING BREAKERS

The reason for the great popularity of Thor Paving Breakers among contractors and builders is the exclusive Thor "measured air" feature which provides more power, longer life and less operating cost—in short, more work done faster and cheaper. Designed to provide the easy handling that gets tough jobs done quicker, Thor Paving Breakers are built from alloy-steel drop forgings. They have the strength, rigidity and balance, plus maximum power to do the tough jobs in minimum time with the least effort.

INDEPENDENT PNEUMATIC TOOL CO.
600 West Jackson Boulevard, Chicago 6, Illinois

New York

Los Angeles

WHAT THOR "MEASURED AIR" MEANS TO YOU

- 1 Balanced Power—because only a precisely governed quantity of air is allowed behind the piston.
- 2 Smooth Performance—because every stroke is powered by the same measured quantity of air.
- 3 Air Economy—because every ounce of air which enters the machine provides a full measure of maximum power for peak efficiency performance.
- 4 Low Maintenance Cost—because there are no separate parts of the patented Thor valve to become lost or wear out.

For more detailed information about powerful, easy operating Thor Paving Breakers and complete line of Thor contractor air tools write or wire for catalog 42-A.

How THOR "measured air" economy works—

The shorter the travel, the more positive the action of the valve in admitting to the tool only the required amount of air—in instantly sealing the inlet against excess air.

Short-travel of the Thor Paving Breaker Valve action powers each stroke of the tool with the same quantity of air. Elimination of excess air keeps out of the channel the overload of power that staggers the stroke and causes vibration.



Model 25
Super heavy duty—84 pounds—extremely powerful—for the hardest kind of heavy duty work under all conditions.

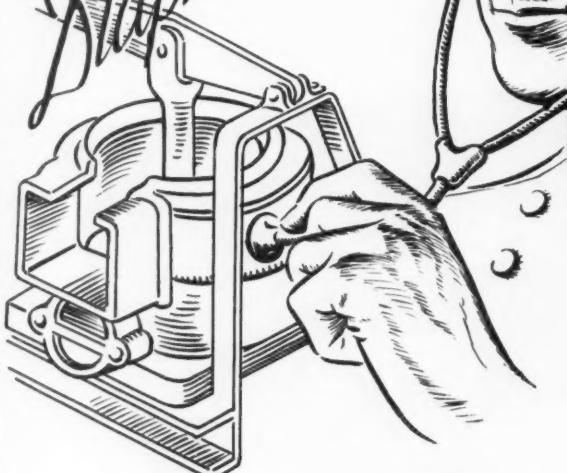


Model 23
Medium duty—59 pounds—exceptional for cutting walls, floors, and street openings. A hard hitting easy handling machine.



Model 17
Light duty—32 pounds—easily handled machine for general light demolition, breaking concrete floors, tearing down walls and similar application.

Diaphragmatis?



Is your Construction Job suffering from "Diaphragmatis"? Is your Diaphragm Pump worn out . . . hard to handle . . . temperamental . . . old fashioned . . . cumbersome? In other words, is your Diaphragm Pump COSTING money instead of MAKING money?

Diaphragm Pumps have a definite place in the Construction Field. They can handle water that is laden with SLUDGE . . . MUD . . . GRAVEL . . . and DEBRIS WITHOUT damage to themselves!

Novo has engineered the ideal Diaphragm Pump. The Novo Diaphragm has an Eccentric Drive instead of a walking beam. This Eccentric Drive means FEWER moving parts . . . SHORTER over-all length . . . LESS dead-weight. Hundreds of these Novo Diaphragm Pumps are serving our War Aims . . . they can do as well for YOUR Post-War Aims!

Is your Construction Job suffering from "Diaphragmatis"? Here's the cure . . . a NOVO DIAPHRAGM PUMP!

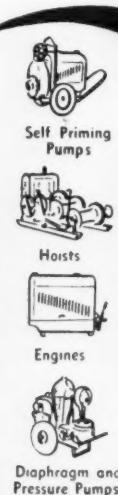


Associate Member of A.E.D.

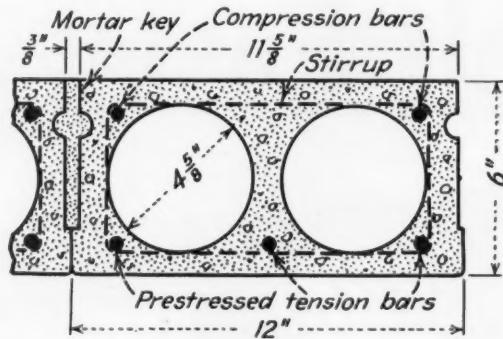
For full particulars about the Novo Diaphragm Pump, write us for Bulletin #167-C.

NOVO ENGINE CO.

LANSING 5, MICHIGAN



FLOOR AND ROOF SLAB called "Flexicore," is pre-cast, hollow-cast reinforced concrete unit which saves weight and material, insulates, fireproofs and provides for flexibility in installation of utilities. Prestressing, or application of permanent tension to lower steel reinforcing rods, eliminates concrete



shrinkage cracks and increases strength to permit erection of spans up to 22 ft. for light load. Standard unit design makes Flexicore readily adaptable. In addition to these structural advantages, new slab speeds installation because it is precast, pre-cured and easily handled. Top side provides level base for any kind of floor covering. Under side presents smooth ceiling ready for painting.—Price Brothers Co., Dayton 3, Ohio.



GENERAL PURPOSE CARGO CRANE, 10-ton capacity, for swift loading, unloading and stacking materials around plants, yards, storehouses and shipping platforms, features a 10-ft., 9 1/4-in. wheelbase, an overall width of 7 ft. 6 in., and a length of 13 ft. 6 in. It is wheel-mounted on solid or pneumatic rubber tires with all controls and steering hydraulically operated. Upper machinery is mounted on a 44-in. cast steel turn-table equipped with hook rollers and oversize center pin which permits full circle operation. Position of operator gives clear view of work at all angles. Telescopic boom extends from 14 to



20 ft. and is raised and lowered by an independent, self-contained worm boom hoist. Two independent drums permit operation as a single line clamshell or two line buckets. Steering is accomplished with dual wheels operating on pivoted axle. Entire unit is operated by a three-speed transmission from a 40-hp. gas engine, for traveling, swinging, hoisting and boom hoist. There are three traveling speeds forward and one reverse, with a low speed of 1.9 mph. and a high speed of 6.75 mph.—Link-Belt Speeder Corp., 307 N. Michigan Ave., Chicago, Ill.

What to do about Rust?

*Make
this Test*



Immerse any rusty nail in a small quantity of Cities Service RUST REMOVER. If badly rusted, allow to remain for several minutes. You can actually see the rust dissolve.

CITIES SERVICE RUST REMOVER has been tested for four years throughout a small, highly industrialized area in the East, where it has earned a unique reputation for performance. RUST REMOVER is a clean, clear liquid, practically odorless, non-inflammable, easily applied,

See the Results



Remove nail and wipe dry with cloth or tissue. Note the complete absence of rust and the way the original surface reappears.

and harmless to handle by those not allergic to specific chemicals. It is fast-acting, and, although heating somewhat accelerates results, general application is recommended at normal temperature (60°-90°F). RUST REMOVER is effective on chromium, copper, aluminum, steel and iron.

5 Big Advantages

1. Non-Inflammable
2. Harmless to Normal Skin
3. Makes Metals Chemically Clean
4. Removes Rust by Chemical Action
5. Free from Muriatic, Sulphuric, Nitric and Oxalic Acids or Cyanide.



See a Free Demonstration of Rust Remover on Your Own Equipment.

(Available only in Cities Service marketing territory East of the Rockies.)

MAIL THIS COUPON TODAY! 

CITIES SERVICE OIL COMPANY

Room 218,
Sixty Wall Tower, New York 5, New York

Gentlemen: I'd like to test RUST REMOVER on my own equipment FREE OF CHARGE. Send me details.

Name.....

Company.....

Address.....

City..... State.....



CITIES SERVICE OIL COMPANY
NEW YORK - CHICAGO

IN THE SOUTH

ARKANSAS FUEL OIL COMPANY
SHREVEPORT, LA.



It has to work alone and like it

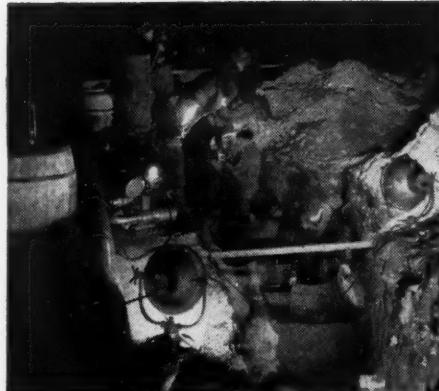
No and's, if's or but's about it, a Homelite Portable Generator, installed in a plane or a tank is in no position to receive nurse-maid attention. It's usually crammed into some hot, tight corner where it is practically impossible to service it.

Which means just one thing . . . a Homelite Generator with its built-in gasoline engine has to work and stand up under the toughest kind of usage . . . hours on end . . . without receiving any attention or service. To meet demands like this . . . born of war . . . Homelite engineers have developed a higher powered, lighter-weight and, above all, a more dependable gasoline-engine-driven generator...a compact, portable Homelite that will meet and pass the performance requirements of any peace-time job.



HOMELITE CORPORATION
PORT CHESTER, NEW YORK

Portable Pumps - Generators - Blowers



FOR YOUR PEACE-TIME JOBS

The new Homelite Portable Generators that you will use after the war for operating brilliant floodlights or electric tools will work better in winter and summer. They will be more dependable even under the toughest operating conditions. They will work longer hours without attention or service . . . and will be more rugged and powerful than ever before.

205

NEW KOEHRING CRUISER CRANE

Does short odd jobs faster. Gets there quicker — at 5.9 M.P.H. Moves loads faster because it can travel, swing, hoist, raise or lower boom... all at the same time. One-man operation, both working and traveling, cuts labor cost. Hydraulic Steering... Stable Chassis... Eight 12:00 x 20 Tires... Visibility Unlimited. Approximately 7-ton capacity.

KOEHRING COMPANY
Milwaukee 10, Wisconsin



ORDERS ACCEPTED
Now
FOR POST-WAR
DELIVERY



HEAVY-DUTY CONSTRUCTION EQUIPMENT



Man trip controlled by Parkersburg HYDROTARDER

RIDIN' TO WORK SAFELY Controlled by the **PARKERSBURG HYDROTARDER**

Among the many valuable present-day applications of the well known HYDROTARDER is the safety of workers being taken to and from the job on slope hoists. Shaft hoists, monitor incline systems and retarder conveyors are other mining industry applications where the HYDROTARDER pays for itself in safety alone.

By absorbing power through fluid friction, the HYDROTARDER automatically retards, or governs the speed of any machine having a power takeoff shaft and requiring a braking means. There is no mechanical friction or wear. It has only one moving part. It does not operate under pressure. Resistance is created exclusively by fluid friction.

The principle of the HYDROTARDER has been proved in oil well drilling for 15 years . . . in numerous other applications for more than five years. It may be the solution to your braking problem. Why not inquire today?

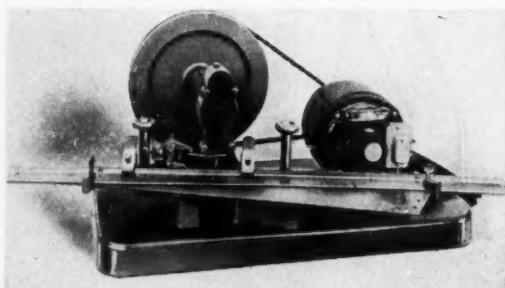
Write us your braking problem, addressing:

THE PARKERSBURG RIG & REEL COMPANY
Department P
Parkersburg, W. Va.

PARKERSBURG

Manufacturers of Quality Products Since 1897

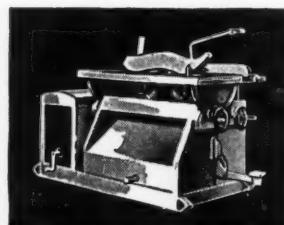
AUTOMATIC HANDSAW RETOOTHER for punching set of new teeth in old handsaws consists of a punch and die mechanism, a drive wheel, a feed mechanism, guide blocks and clamps with adjustable spring tension, all assembled and mounted on an 11x24-in base. Powered by $\frac{1}{4}$ -hp. electric motor. Five index bars are supplied to provide any desired cutting for either cross-cut or rip. To re-



tooth any handsaw, handle is first removed. Proper index bar is selected, placed in saw carrier and tightened in place with two C-clamps. Next bed-plate is swung to proper angle for cross-cut or rip saws and tightened. Saw and carrier then are inserted into machine from left until index bar is under pawl and power supplied. Teeth are punched out one at a time in rapid succession (240 per minute) until complete retoothing is accomplished. It is unnecessary to cut or grind off old teeth as they come off as chips. New teeth are ready for setting and filing.—Burro Manufacturing Co., 3392 Robertson Blvd., Los Angeles, Calif.

C.H.&E.

SAW RIG



No. 33 Saw Rig

We also manufacture Pumps—
Hoists—3 Ton Rollers—Bar Cutters and Benders.

Write for catalog.

C. H. & E. Manufacturing Co.
3847 No. Palmer St.
Milwaukee 12, Wis.

*There's
been a
big change*



THE old-time "carry-all" got 'em there and brought 'em back. But ever-increasing demands of travel have resulted in improved transportation today.

Bearing demands have increased, too. A change was inevitable. Tyson achieved a big improvement by developing a tapered roller bearing with 30% more rollers around the raceway.

The Tyson "All Rolls" Bearing stepped up performance in two ways: 1. It greatly increased load-carrying capacity. 2. It practically doubled bearing life.

Operators of heavy-duty equipment say Tyson is the most advanced, the toughest, the longest-lived bearing ever built.



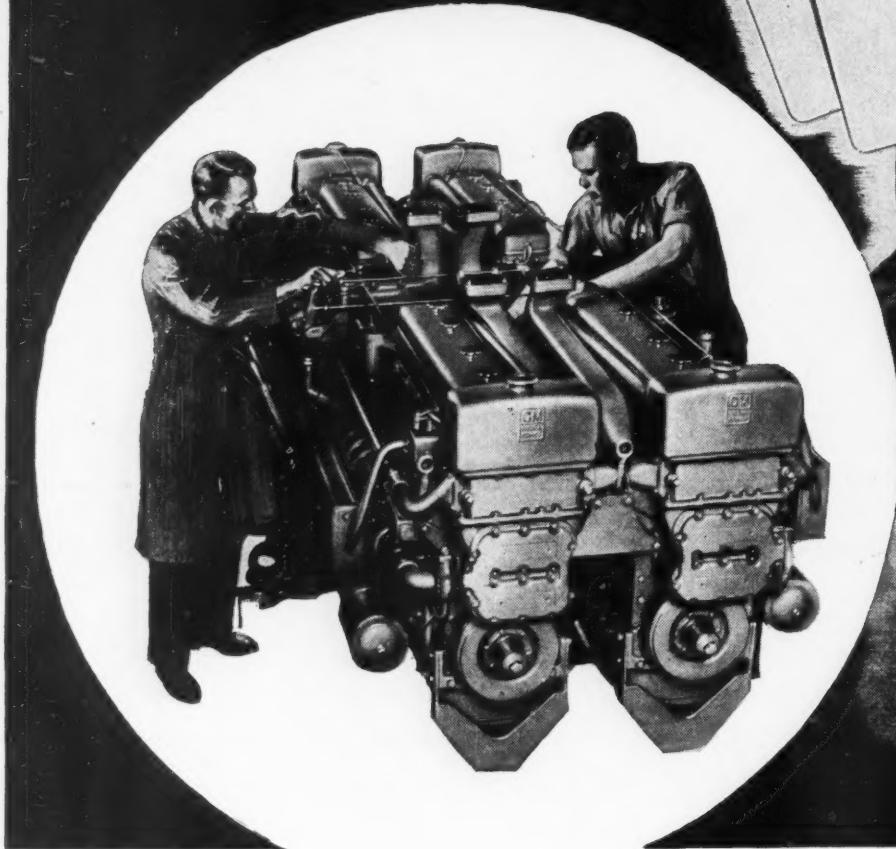
TYSON BEARING CORPORATION • MASSILLON, OHIO

COUNT THE ROLLS • THE ROLLS COUNT

TYSON
TODAY'S HEAVY-DUTY BEARING

★ BUY MORE WAR BONDS ★

FOUR OF A KIND



Here is a power unit made up of four General Motors Series 71 6-cylinder Diesel engines driving a single shaft. The unit may be operated on one or more of the engines, as required.

It's called the "Quad," and two of them power each of the famous LCI landing boats. Quads save space and weight so more troops, equipment and fuel can be carried.

Half a "Quad"—two 6-71 engines mounted side by side—is a "twin," and these power Army tanks and tank destroyers.

Here is economical power for many postwar uses—power at less than 15 pounds per horsepower—power for applications where space and weight are at a premium.



All kinds of construction jobs lie ahead. And the answer to the dependable, low-cost power that will be needed is GM Diesel engines. These dependable, easy-on-the-fuel engines have proved themselves both in war and peace in all kinds of construction equipment.

*KEEP AMERICA STRONG
BUY MORE WAR BONDS*

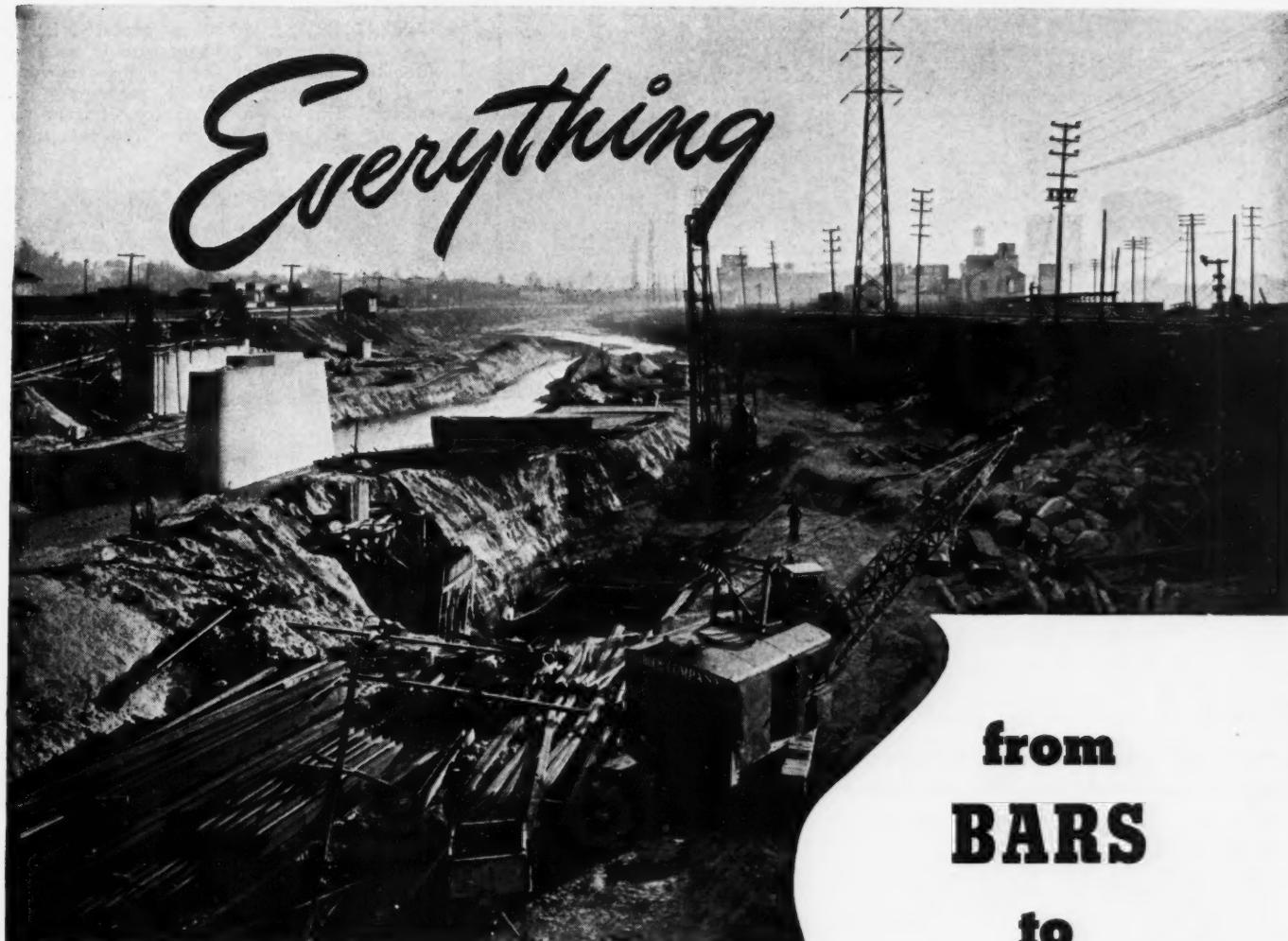


ENGINES . . . 15 to 250 H. P. . . DETROIT DIESEL ENGINE DIVISION, Detroit 23, Mich.

ENGINES . . . 150 to 2000 H. P. . . CLEVELAND DIESEL ENGINE DIVISION, Cleveland 11, Ohio

LOCOMOTIVES . . .

ELECTRO-MOTIVE DIVISION, La Grange, Ill.



**from
BARS**

**to
SHEET PILING**

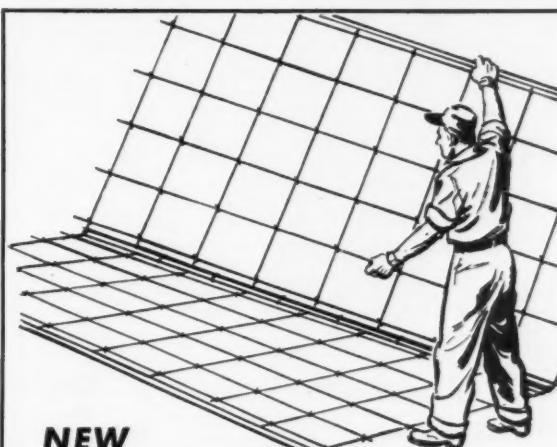
That's what road builders will be able to obtain from Bethlehem warehouses when unrestricted building is resumed, as they did before the war. Contractors have found that it pays to make Bethlehem headquarters for all steel products used in building highways, streets, roads and highway bridges. Time, money and trouble can be saved by choosing needed products from Bethlehem's complete line, and obtaining them on a single order.

Whatever road steel products you need—bars, pipe, mesh, road joints, wire rope, steel highway guards and posts, piling for either retaining or load-bearing structures, or any other item listed below—you'll find that Bethlehem products are sturdy and reliable. They're designed and built for rugged performance.

Post-war highway projects are now rapidly shaping up. Let Bethlehem help you get going fast when the word is given. For full information about Bethlehem road steel and allied products, get in touch with the nearest district office, or write direct to Bethlehem Steel Company, Bethlehem, Pa.

OTHER BETHLEHEM PRODUCTS FOR HIGHWAYS

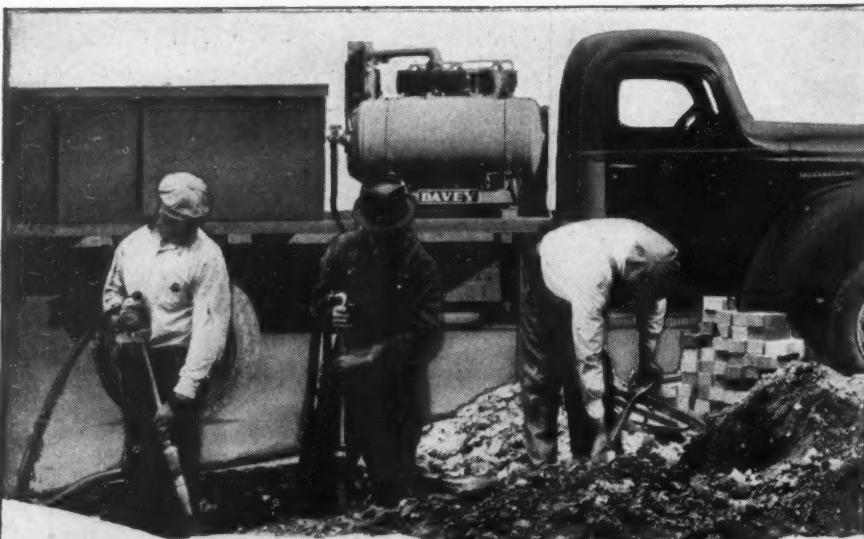
Road Joints Dowels Dowel Bar Supports Center Strip
 Wire Rope and Strand Bar Ties Guard Rails
 Anchor Rods Right-of-Way Fence and Posts Pipe
 Hollow Drill Steel Digging Bars Structural Steel
 Reinforcing for Concrete Pipe
 Bridge Floor Reinforcing Corrugated Sheets
 Concrete Slab Spacers Turnbuckles
 Tie Rods, Spikes, Bolts and Nuts
 Highway Guard Posts and Brackets
 Timber Bridge Hardware Sheet and H-Bearing Piling



**NEW
FOLDING BAR MAT**

For convenient handling and stockpiling in wide widths, Bethlehem has developed a new hinged reinforcing-bar mat which folds over double. Made like the regular bar mat, of deformed bars clipped together, it is easier to truck, and can be handled by two men. It is less likely to be damaged in handling, is readily installed, and lies flat.

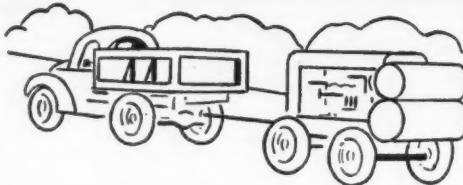
Bethlehem reinforcing bars, plain and deformed, are made of new billet steel in standard sizes and grades, and can be bent to shape and cut to size in most Bethlehem warehouses.



WHERE QUICK REPAIRS ARE NECESSARY DAVEY AUTO-AIR IS BEST!

SAVES • TIME • MONEY • MANPOWER

The conventional, trailer-mounted air compressor still has its place on construction jobs where air is needed in one place for a period of days or weeks. Here, the famous Davey Air Aristocrat does a job second to none.



MOST COMPRESSOR JOBS ARE SMALL

But most construction compressed air jobs are small—and can be done FASTER, MORE ECONOMICALLY, WITH LESS MANPOWER by taking advantage of the MOBILITY of the DAVEY AUTO-AIR COMPRESSOR.

The Davey AUTO-AIR is mounted on the truck, and will go anywhere as fast as the truck can go. At the same time, because the AUTO-AIR occupies less than one-third of the body space, the same truck can carry the men, tools and materials to do the job.

Power for the compressor is taken direct from the truck engine through the Davey Power-Take-Off. Use of one engine reduces "first" cost, lowers operating and maintenance costs—provides more air-per-dollar-invested over a long period of years. This time-proved, heavy-duty compressor can be mounted on most trucks—whether new or already in use and can be readily changed from one truck to another.

Available in 60, 105, 160, 210 and 315 cfm capacities.

**EVERY CONTRACTOR CAN USE AT LEAST ONE
DAVEY AUTO-AIR COMPRESSOR TO GET MORE
JOBs DONE PER DAY... FASTER, CHEAPER**

DAVEY PNEUMATIC SAWS

"Another Davey time-saver, man-saver, and money-saver." Portable, efficient, cross-cut saw for felling and bucking timber, piling and shoring. Operates anywhere—even under water. Three sizes—15", 18", 24" blades. Can cut 15" timber in 40 seconds.

COMPLETE YOUR ENGINEERING LIBRARY

For full information on the complete Davey line of Compressors, Truck Power Take-Offs, Pneumatic Saws and additional pneumatic engineering data, write today for free catalog E-172.

D-14E-2

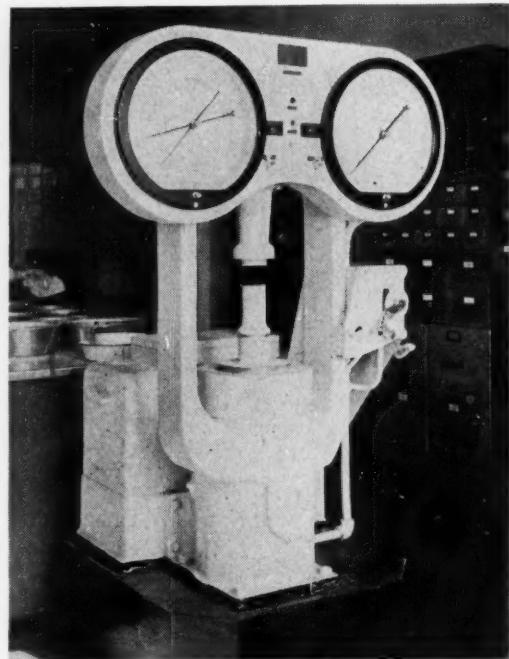
DAVEY

Compressor Co.
KENT • OHIO

DEALERS IN PRINCIPAL CITIES



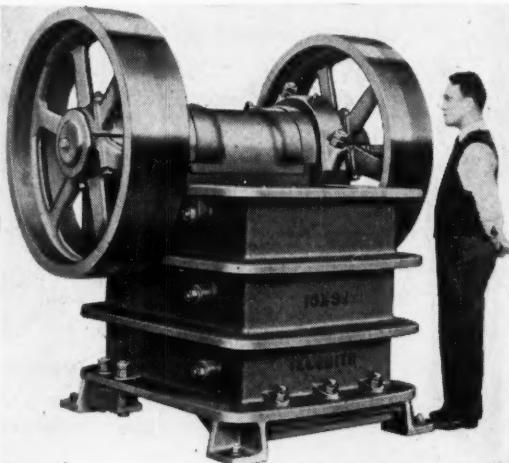
CEMENT TESTER. 90,000-lb. capacity, has found new use in cement field for making tests on new air-entraining cement because these cements are said to be easier tested in compression than in tension. This Southwark-Emery compression testing machine has an accurate "rate of loading con-



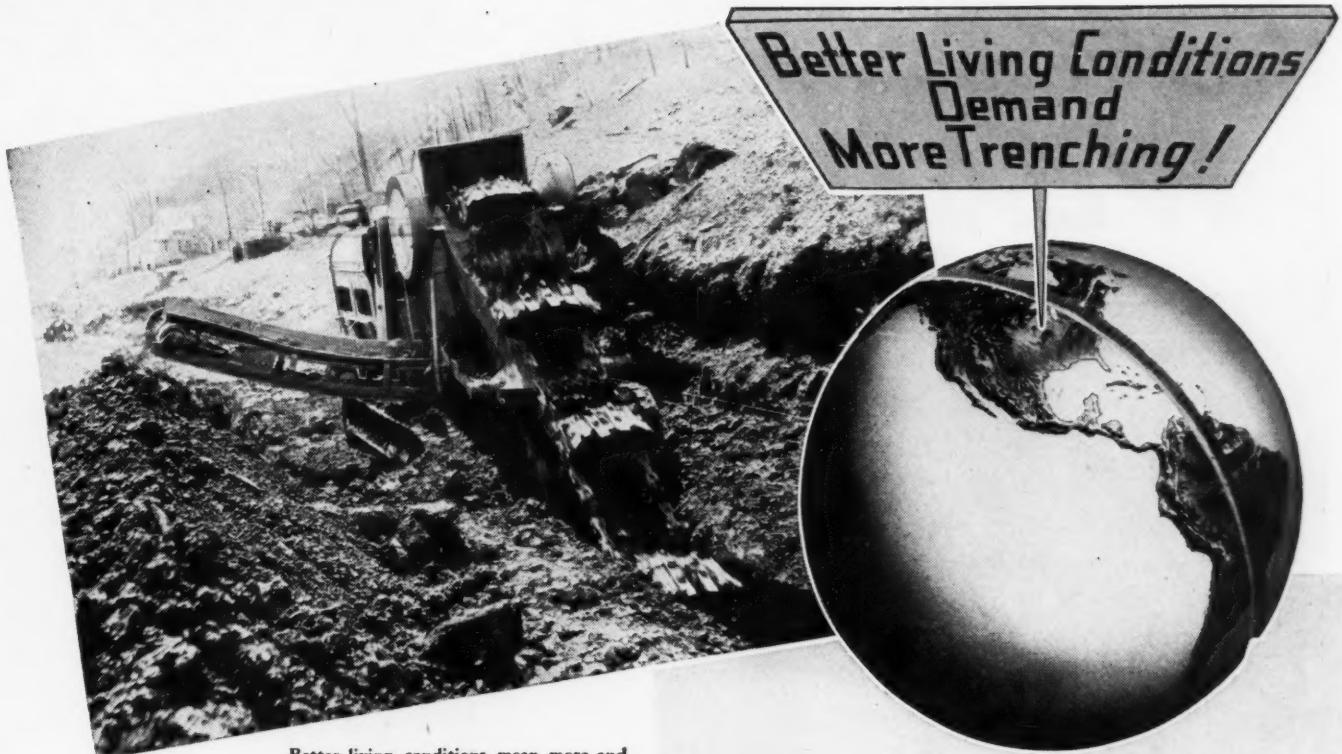
trol" paced by Telecran operated disks, a separate weighing system which is provided by the Emery capsule, and an adequate dial scale length and requisite accuracy over operating ranges. This latter feature is provided by two dials 33-in. scale length each, one of 90,000-lb. and one of 10,000-lb. capacity.—Baldwin Locomotive Works, Eddystone, Pa.

★ ★ ★

ROLLER-BEARING JAW CRUSHER. 18x32 in. in size, has been added to new line of Telsmith units which now numbers nine sizes with capacities ranging from 5 to more than 300 tons per hour. While featuring several improvements in these new



crushers, the company has retained the regular standard cast steel frame and swinging jaw construction believing it to be an insurance against weaving and cracking with resultant misalignment of bearings and other parts.—Smith Engineering Works, 510 E. Capitol Drive, Milwaukee 12, Wis.



Better living conditions mean more and better sanitation, running water, more gas, electricity and telephones that all call for trenching—millions of miles of it—dug fast and at low cost—and that calls for Buckeyes. Model 410 shown—is one of over a dozen models; ladder and rotary digging wheel type.

Better living conditions for more people, for which we are now fighting, call for new airports and highways which will require proper drainage, new irrigation projects and aqueducts to bring ample water supplies to cities in need—as in the past, Buckeye trenchers will be available to dig the trench at minimum cost—more and better Buckeyes. Model 260 shown.



Today, and for a long time to come, as a nation we have millions of market baskets to fill, here and abroad. Buckeyes—the original and still the most widely preferred power trench digging machines—are even now aiding food production through reclamation drainage of lowlands and through soil conservation tiling. Model 1 shown.

If you are looking ahead—
send for Trencher Catalog.



Built by Buckeye ✓

Buckeye Traction Ditcher Co., Findlay, Ohio



Convertible Shovels



Trenchers



Tractor Equipment



Road Wideners

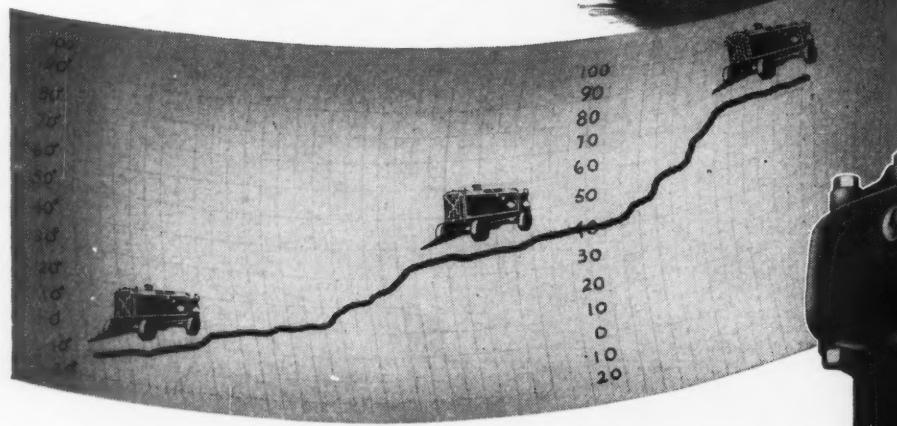


R-B Finegraders

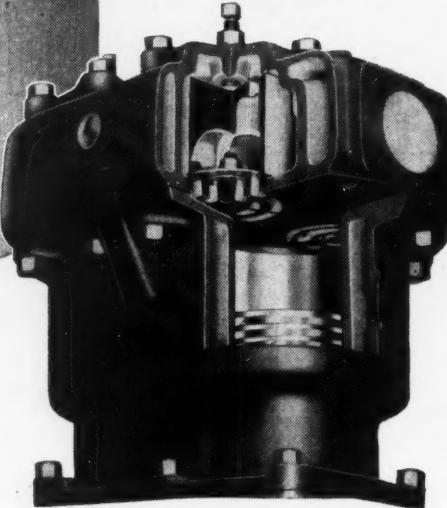


Spreaders

Never mind the **WEATHER**



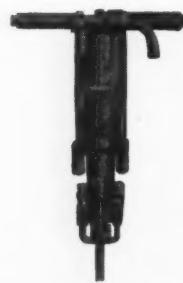
*Water-Jacketed
Cylinder*



... with an **ALL Water-Cooled Portable!**

Hot weather . . . cold weather, it makes no difference in the operating efficiency of a Gardner-Denver "all water-cooled" Two-Stage Portable Compressor. Its completely water-jacketed compressor cylinders keep cool in summer . . . warm in winter. Temperature or altitude extremes do not reduce its capacity or limit its operation. Hot or cold, it keeps right on delivering.

"All water-cooling" has other exceptional advantages. Discharge temperatures are lower . . . effecting considerable savings in oil consumption and in valuable air hoses. High efficiency is sustained . . . air output is higher . . . horsepower requirements lower. And Gardner-Denver "all water-cooled" portables require no pampering, regardless of operating conditions.



GARDNER-DENVER SINKERS

Popular with contractors and operators alike, Gardner-Denver Sinkers are noted for their smooth, easy riding characteristics and perfect balance, assuring more footage per shift.

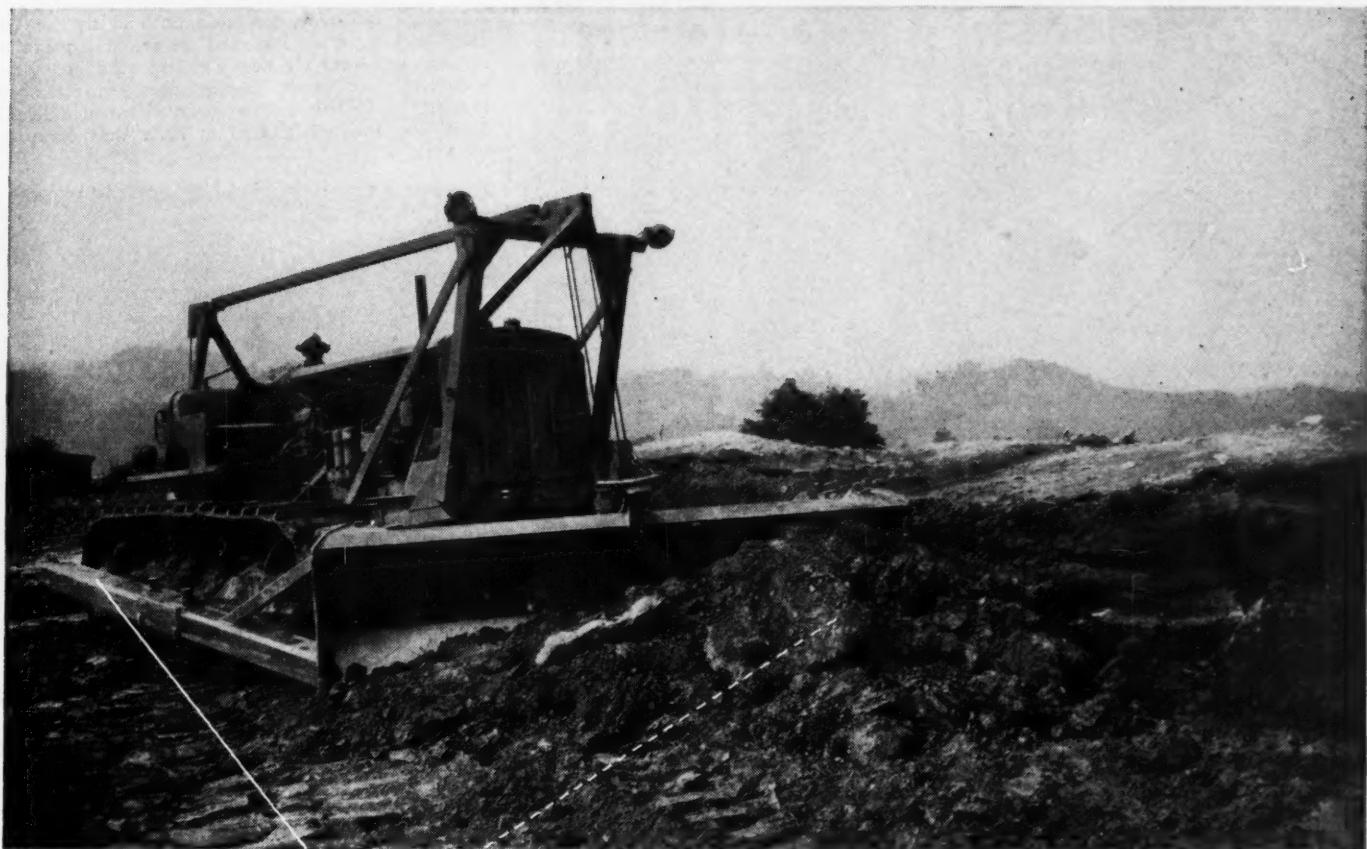


For complete information on Gardner-Denver Portable Compressors and Sinkers, write for illustrated bulletins. Gardner-Denver Company, Quincy, Ill.



GARDNER-DENVER

Since 1859



Cleaner engines, less wear, lower maintenance costs
*with **GULF DIESELUBE H.D.***

... the improved heavy-duty oil for trucks and tractors

HERE'S THE OIL that sets a new standard of performance for truck and tractor service. Gulf Dieselube H.D. is especially manufactured for lubrication of automotive type Diesel engines, and for gasoline engines operating under heavy-duty conditions.

Gulf Dieselube H.D. is a quality lubricating oil of the improved detergent type — helps keep motors clean, and rings free. It holds carbon and sludge forming materials in suspension, thus preventing harmful deposits in the crankcase and on rings and pistons. It is noncorrosive to all types of alloy bearings, including copper lead and cadmium silver.

U. S. Army Specification 2-104B for heavy-duty

motor lubricating oil is met in every respect by Gulf Dieselube H.D., and large quantities of this oil are being used in practically all war theaters from the Arctic to the Tropics in all types of Army motorized ground equipment—both Diesel and gasoline engines—in trucks, busses, jeeps, tanks, tractors, ambulances and other service vehicles.

This high quality oil is giving outstanding results in all types of contractors' motorized equipment, and in many commercial bus and truck fleets, Diesel powered or equipped with gasoline engines operating under heavy-duty conditions.

To get Gulf Dieselube H.D. now, write, wire, or phone your nearest Gulf office—available in 30 States, Maine to Texas.

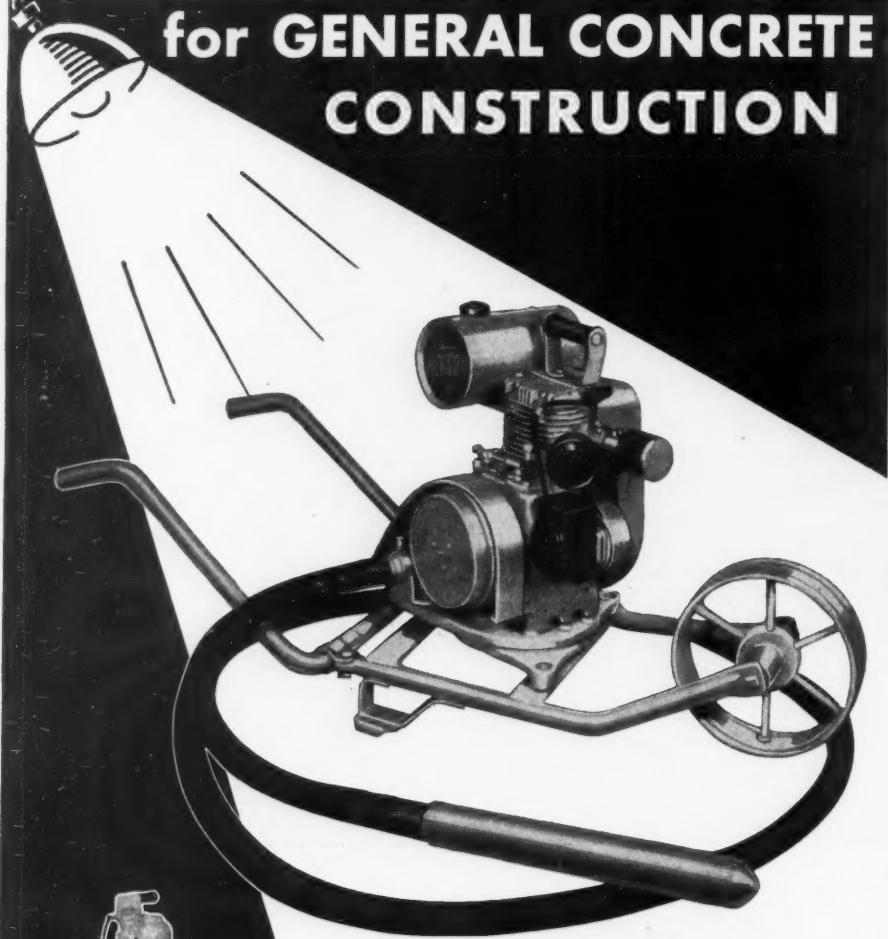
GULF OIL CORPORATION • GULF REFINING COMPANY

Division Sales Offices:

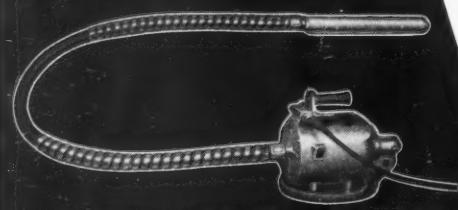
Boston • New York • Philadelphia • Pittsburgh • Atlanta
New Orleans • Houston • Louisville • Toledo



for GENERAL CONCRETE CONSTRUCTION



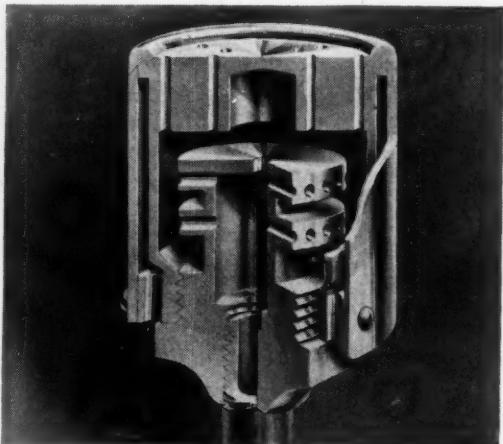
For light work and hard-to-get-at places, buy this JACKSON Model FS-4A flexible shaft vibrator. 110-120 Volt A.C., D.C., Universal Motor, $\frac{1}{2}$ H.P. at 6500 V.P.M. Vibrator head sizes $1\frac{3}{16}$ " x 17" or 10". Shaft lengths — 24 in., 39 in., 7 ft., and 14 ft.



Model FS-5A JACKSON flexible shaft vibrator. For heavier work than FS-4A above. Motor is 110-120 volt A.C., D.C., Universal, $\frac{3}{4}$ H.P. at 7000 V.P.M. Shaft lengths up to 21 ft. Head sizes $2\frac{3}{8}$ or $1\frac{3}{16}$ " diameter. Bowl type base.

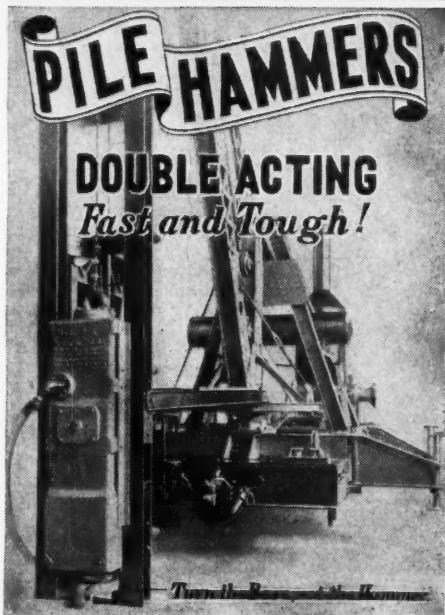
ELECTRIC TAMPER & EQUIPMENT CO.
LUDINGTON MICHIGAN

HEATING NOZZLE, designed particularly for use with oxygen and liquefied petroleum gases or natural gas and for use with all standard victor welding torch butts, incorporates an outer air mantle to protect nozzle head against deflected heat. Its internal design is such that cool and



pre-mixed gases carry away a substantial amount of accumulated heat and in doing so become efficiently preheated for proper combustion. Similar multi-flame heating nozzles also are available in numerous sizes for use with oxyacetylene. Larger multi-flame heating nozzles are recommended for flame priming and descaling in inaccessible areas. All of them may be used for various silver brazing operations, preheating and bending.—Victor Equipment Co., 844 Folsom St., San Francisco, Calif.

UNION



EST. 1900
Union Iron Works, Inc.
ELIZABETH, New Jersey



On the Quai de L'Ancien Arsenal in France, this 15-B excavates for a track spur to speed supply lines.



To open the way for military traffic, a 15-B clears away the debris from the streets of Domfront, France

FOLLOWING-UP THE ATTACK



At La Haye du Puits, in France, this 15-B tears down the condemned walls of a shattered building.



A 1/2-yard 15-B, in wartime wooden dress, clears a Beach in New Guinea to facilitate unloading cargo from landing craft.

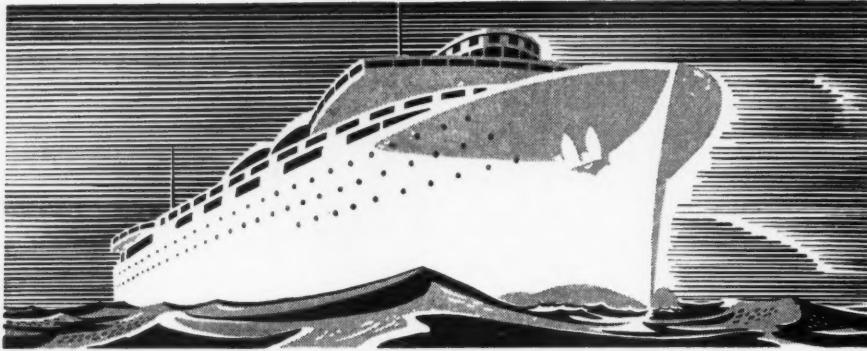
Signal Corps Photos

WHILE battle-front excavators help to put extra sting into the Allied attack, their counterparts behind the lines — in the wake of advancing arms — keep open the routes of supply. To them falls the job of repairing bomb-gouged roads, removing the rubble of blasted ruins, clearing the debris of battle.

By reason of their outstanding performance as well as their number, the Bucyrus-Eries in this work are, as always, conspicuous. Their easy handling, fast action, smooth application of power, and all-around strength again make them output leaders, just as they have been for years — and will be in the reconstruction to come.

v-76.





Your ship comes in

When the ship's engines have the cylinders treated with PORUS-KROME . . . *your ship comes in*. It is mighty important in marine engines to do everything possible to prevent the ship being held up for engine repairs far from home.

This is equally true when "your ship" is a bus . . . or a truck . . . or a farm tractor working the far forty. Reliability of engine performance, which assures that you will always get home, is most important.

PORUS-KROME, because of its peculiar characteristics, reduces scoring and scuffing and the risk of piston seizure to the absolute minimum. It not only adds to the reliability of the engine, but it multiplies

the life of the cylinders from four to twenty times, thus greatly reducing costs of overhauling for cylinder repairs.

PORUS-KROME, applied to cylinder bores by the Van der Horst process, is pure, hard chromium which has myriads of tiny pores and channels in its surface. These pores and channels serve as reservoirs which hold lubricating oil and feed it back to the cylinder surface as needed. Better lubrication, plus the fact that chromium is so much harder than iron or steel, reduces wear to a minimum.

Plan now to have PORUS-KROME in your gasoline and Diesel engines. Write for booklet telling more about PORUS-KROME.

PORUS - KROME



Good for the Life of your Engines



U. S. PATENTS 2,048,678 AND 2,314,604

VAN DER HORST CORPORATION OF AMERICA

AN AFFILIATE OF DRESSER INDUSTRIES

CLEAN • NEW YORK
CLEVELAND 11 • OHIO



The Equipment Line that TOPS THEM ALL

**CONCRETE
MIXERS**

**PLASTER - MORTAR
BITUMINOUS
MIXERS**

**DIAPHRAGM
PUMPS**

**DUAL PRIME
PUMPS**

**RADIAL ARM
SAWS**

HOISTS

BATCHING AND PLACING EQUIPMENT • CARTS AND BARROWS

Your equipment NEEDS for post-war construction must meet changed conditions! New structural designs, new materials, plus the greatest BACKLOG of building demand in the history of the U. S. A. . . . that's what YOU MEN in the construction industry FACE!

CMC equipment is ready to help you meet these new conditions!

Your old standby CMC Mixers, Pumps, Plaster and Mortar Mixers, Batchers, Hoists, Carts and Barrows improved and up-to-the-minute in every feature you need. In addition, there's the new CMC Radial Saw . . . a marvel of speed and efficiency. The new CMC Concrete Gun is something to "write home about" when it comes to fast construction. And the

CMC Electric Generating Plants to take the "juice" for power and light right to the job.

That's why we say, CMC is the equipment line that tops them all!

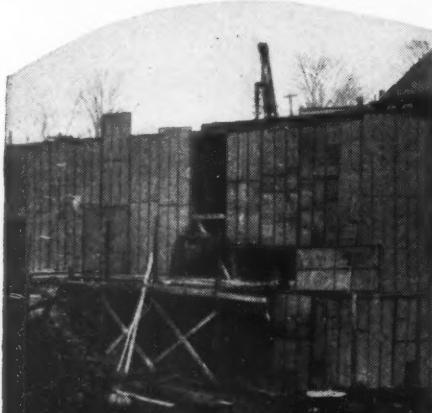
CONSTRUCTION MACHINERY CO.

WATERLOO, IOWA

**ELECTRIC
GENERATING
PLANTS**

**CONCRETE
GUNS**

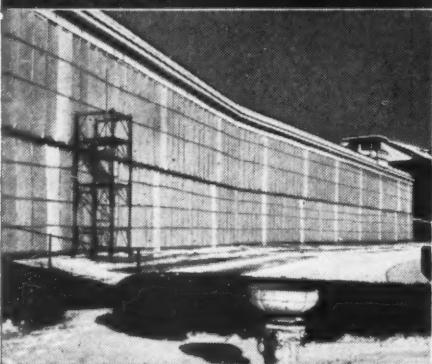
Shut Out the Weather with SISALKRAFT



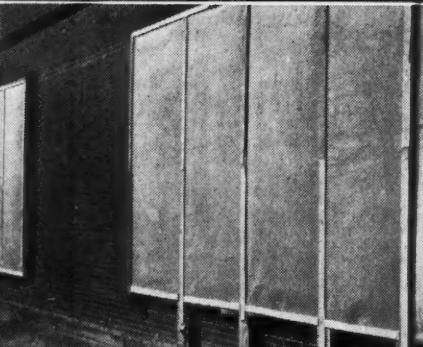
SISALKRAFT confines steam better than canvas for winter curing. Costs less — saves fuel.



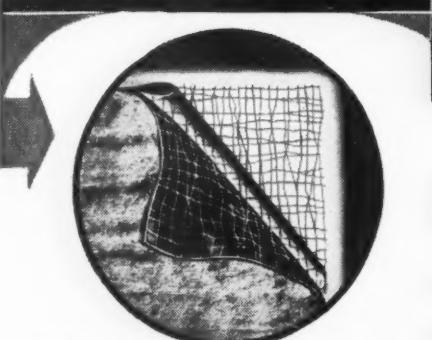
Materials stored in the open are protected from weather when covered with SISALKRAFT.



This is a SISALKRAFT-enclosed job that withstood a heavy gale.



Cover window openings with SISALKRAFT. It won't rip easily or ravel and can be used again and again.



Sisal fibre reenforcement for strength — special asphalt for waterproofness — kraft paper treated to make it scuff-proof — sealed by heat and pressure — to produce SISALKRAFT.

USE windproof SISALKRAFT for every cover-up job — to shut out the weather and hold in the heat. And don't forget to cure and protect all concrete with time-tested SISALKRAFT.

THE SISALKRAFT CO.
205 W. WACKER DRIVE · CHICAGO 6, ILL.
NEW YORK · SAN FRANCISCO · LONDON · SYDNEY
In Canada Write to Alexander Murray & Co., Limited, at
Montreal · Toronto · Halifax · Saint John · Winnipeg · Vancouver

Manufacturers of
SISALKRAFT, FIBREEN,
SISAL-X, SISALTAPE AND
COPPER-ARMORED SISALKRAFT

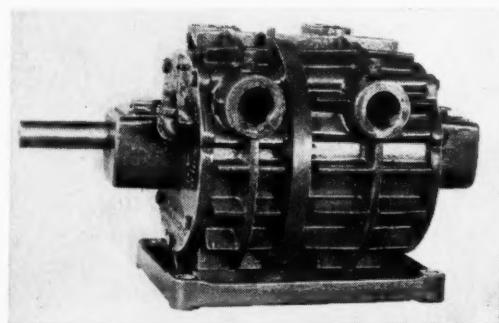
METALLIZING GUN for high speed production spraying of low melting point metals uses $\frac{1}{8}$ -in. zinc, tin, lead, solder, babbitt, cadmium or fine-gage and copper alloys and is said to attain rates of deposition, in pounds per hour, as follows: zinc, 40; tin, 70; lead, 110; solder, 90; babbitt, 75. Regardless of type of wire used, no gear changes



are necessary to achieve high speeds. Gun is equipped with Universal gas head which permits tool to be operated by any commercial gas in conjunction with oxygen and compressed air. Duplex mounting fixture is provided for permanent installation on production set-up. Typical applications: corrosion-resistant coatings on iron and steel structures and equipment; water- and chemical-resistant linings for storage tanks and degreasers, conductive and soldering surfaces on glass, plastics and carbon products.—Metallizing Engineering Co., Inc., 38-14 30th St., Long Island City, L. N. Y.

* * *

TWO-CYLINDER PUMP combining advantages of two separate single-cylinder pumps as to service while retaining compact construction of single pump is of rotary type and is used for air pressures up to about 50 lb. per sq. in. and for vacuum up to 28.7 in. mercury. While one cylinder is used for pressure, other may be used for vacuum or



both may be used for pressure or for vacuum. One cylinder may pump into other for air pressure increase, or one may pump from other to increase vacuum as occasion may require, resulting in cooler operating pumps than where singles are used. Available in several sizes, these pumps are claimed to be smooth in operation, cool and quiet running.—Leiman Bros., 115-74 Christie St., Newark, N. J.

7½
MILLION
CUBIC YARDS OF
TOUGH OVERTBURDEN
"NON-STOP"



25-CUBIC-YARD
PAGE Automatic AT WORK

The first 25-cubic-yard dragline bucket is a Page Automatic owned by the Northern Illinois Coal Corporation. It is shown at work, and below after its non-stop run of 7½ million cubic yards when it was sent to the yard for its first reconditioning.

SAME PAGE AUTOMATIC AFTER
7½ MILLION CUBIC YARDS OF
STRENUOUS WORKOUT



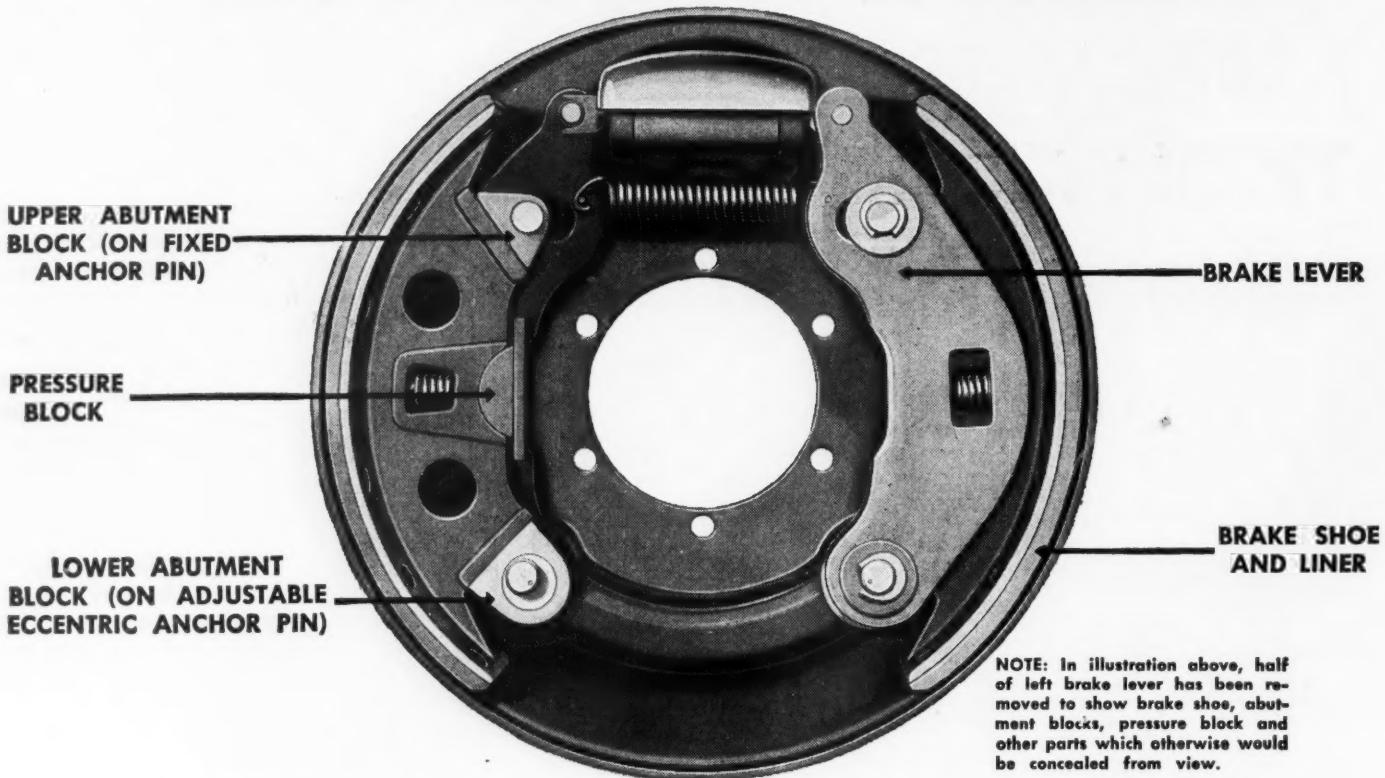
PAGE ENGINEERING COMPANY • CHICAGO 38, ILLINOIS

The new

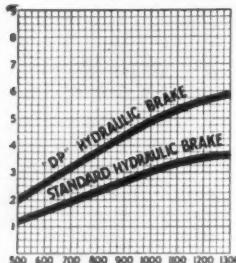
TIMKEN "DP" BRAKE

DUAL PRIMARY

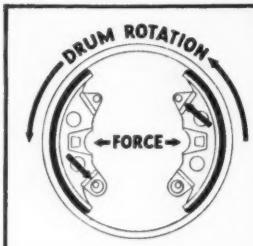
medium duty series for hydraulic actuation



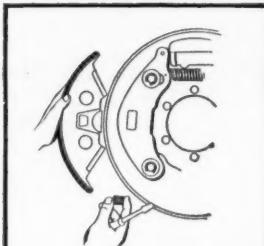
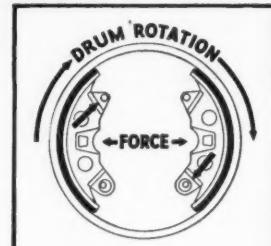
NOTE: In illustration above, half of left brake lever has been removed to show brake shoe, abutment blocks, pressure block and other parts which otherwise would be concealed from view.



30% to 35% greater braking ability at all hydraulic line pressures.



Both shoes are equally self-energizing, regardless of direction of drum rotation.



Shoes can be removed in a few seconds, with just a screwdriver.

Greater braking ability . . . longer liner life . . . complete driver control . . . utmost simplicity . . . equal effectiveness in forward or reverse . . . these and other features of the new Timken "DP" Brakes fully meet today's needs for the improved brake performance

demanded by heavier loads and faster schedules.

Timken "DP" Brakes are available on certain vehicles now being produced. Write for descriptive folder — see how perfectly these modern brakes meet YOUR needs!

38 YEARS OF AXLE ENGINEERING LEADERSHIP



T I M K E N A X L E S

THE TIMKEN-DETROIT AXLE COMPANY, DETROIT 32, MICHIGAN
WISCONSIN AXLE DIVISION . OSHKOSH, WISCONSIN



More
**COMPRESSED AIR
THIS EASY WAY**

Operating a sand blast on drainage culverts—the job made easier because a steady flow of compressed air is furnished by Schramm air compressors! Just push a button—and all the air you want!

Features: 100% water cooled . . . rugged enough to be towed, even to hard-to-get-to places . . . light-weight enough to be moved about easier.

Schramm is known as a versatile compressor because it can be used wherever air is needed. Necessarily, such a compressor is economical to own. If you are not using a Schramm today, you will profit by writing at once for details and descriptive data.

SCHRAMM INC

**THE COMPRESSOR PEOPLE
WEST CHESTER
PENNSYLVANIA**

MEMO
TO ALL CONSTRUCTION SUPTS.:—

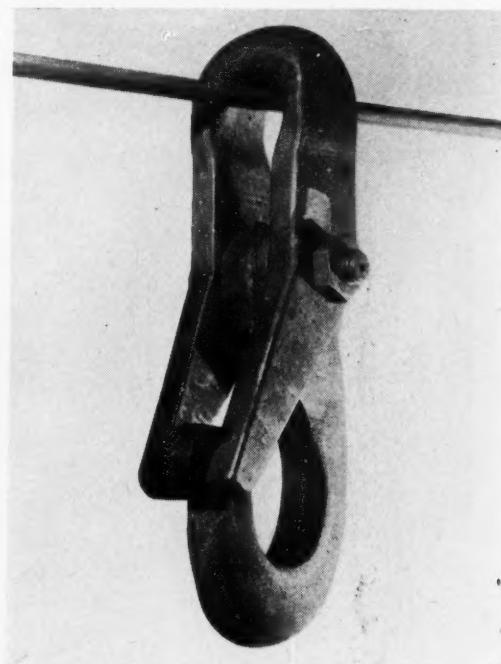
Are all buckets
just "buckets"?
Shouldn't we find out
if HAISS Hi-Power
Reeving does mean
bigger payloads?
M.R.

HAIFF
HI-POWER

For Catalogs, Prices, Deliveries
Write or Wire

GEORGE HAISS MANUFACTURING CO., INC., 1291 ST. A CANAL PL., NEW YORK 51, N.Y.

HEAVY-DUTY HOIST HOOK invented by Robert Hoffman after intensive research for a hook which would be proof against breakage, slippage, work stoppages and accidents to life and property, weighs $9\frac{1}{2}$ lb., has a guaranteed capacity of 10 tons and has withstood without ill effects a Columbia University laboratory proof load test of 60,000



lb. Hook keeps hoist and load in true alignment. Patented shoulder and lip eliminate load slippage and hook straightening. Even should heavy pin shear, weight of load would continue to hold on safety shoulders and lips which were carefully designed to clear hatches, cornices and other protuberances without snagging. Manufactured and distributed by—American Chain Ladder Co., Inc., 151 E. 50th St., New York 22, N.Y.

FORGED WITH A FULL-LENGTH BACKBONE AND
"SURFACE PEENED"

CAN TAKE MORE PUNISHMENT,
TUBULAR SHANK

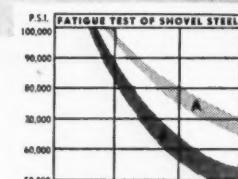
DO MORE WORK!

RAZORBACK™ SHOVEL WITH A BACKBONE

**the latest, toughest and finest
RAZOR-BACK SHOVEL**

To its famous "backbone" construction, RAZOR-BACK now adds a new advantage. The steel is "Surface Peened"—stands constant bending $2\frac{1}{2}$ to 5 times longer than usual fine shovel steel—makes RAZOR-BACK, the strongest of light shovels, even tougher and longer lived. Send for Catalog and prices.

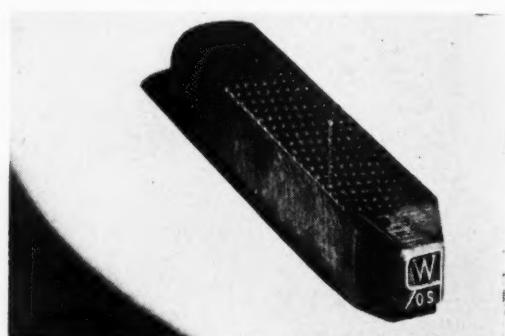
THE UNION FORK & HOE COMPANY
653 Hocking Street Columbus 15, Ohio



Standard tests of the American Society for Testing Materials show how RAZOR-BACK "Surface peened" steel ("A") withstands continuous 2-way bending longer than fine heat-treated steel—
 $2\frac{1}{2}$ times longer at extreme of 90,000 lbs. per sq. in.
5 times longer at 80,000 lbs.
Unlimited at 70,000 lbs.

ALSO MAKERS OF STONE, BALLAST AND INDUSTRIAL FORKS—ASPHALT AND ROADRAKES

"LETTER-OUTLINE" STEEL HAND STAMPS for use in identifying producer, operator and operation are now available in a variety of sizes to suit particular needs of users, most popular being $3\frac{1}{16}$ and $\frac{1}{4}$ in. Shanks are made either plain or knurled for thumb and finger gripping. All letters,

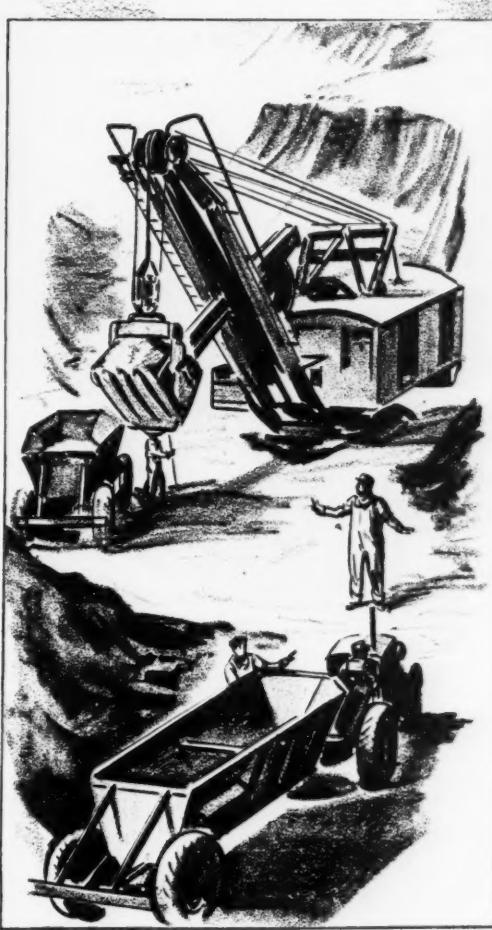


outlines and designs are finished with "Newco" bevel which insures long life and clear marking. Tapered and rounded head prevents peening and dangerous chipping under heavy blows. Each stamp tempered by modern heat-treating methods. New line of stamps particularly suitable for use of subcontractors who are making same part and shipping them into contractors plant in quantities.—**New Method Steel Stamps, Inc.**, 147 Jos. Campau, Detroit 7, Mich.

Do you know that . . .



SINCLAIR PRODUCING OIL WELLS
IF PLACED END UNDER END
WOULD REACH TO THE CENTER
OF THE EARTH—MORE THAN
3,500 MILES. SINCLAIR RANKS
AMONG THE LARGEST PRODUCERS
OF CRUDE OIL.



SINCLAIR'S 10 GREAT REFINERIES, IF MASSED
TOGETHER, WOULD COVER AN AREA OF 2,300 ACRES
—THE APPROXIMATE AREA OF A CITY OF 100,000
POPULATION. THESE REFINERIES MANUFACTURE
A FULL LINE OF QUALITY PETROLEUM PRODUCTS
FOR ALL MILITARY, INDUSTRIAL AND GENERAL USES.

FOR SAFE LUBRICATION OF
EQUIPMENT UNDER HEAVY DUTY
OPERATION SINCLAIR PROVIDES
SPECIALIZED MOTOR OILS AND
GREASES . . . ALSO TEN-OL 200
PREPARED SPECIFICALLY FOR
DIESELS, DIESEL-POWERED BUCKETS,
SHOVELS, AND BULLDOZERS.

SINCLAIR IS EQUIPPED TO SERVE YOU BETTER!

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY, 630 FIFTH AVENUE, NEW YORK 20, N.Y.

A Real Renewable Lip for Long Dipper Life and Economy

Old timers in power shovel operation know that renewable dipper lips were used almost as soon as replaceable teeth, both of them with the patent object of replacing the more quickly worn dipper parts as an obvious measure of economy.

But until 1930 the only renewable lips available were of the riveted type, with which, each time a change was made, the dipper must be dismounted

matter, usually, of days rather than hours.

To remedy this wasteful condition, the Amsco detachable rivetless lip was developed which could be replaced with only a few minutes' delay to shovel operations by means of the patented "U"-bolt fastening, interlocking-joint design.

The front (not the lip) is secured to the sides of the dipper by means of rivets and,



An Amsco renewable lip dipper on a Lima shovel owned by Groves, Lundin and Cox, Burgettstown, Pa., at work on track relocation project for the Pennsylvania Railroad. 1,023,000 yds. of clay, shale and rock were moved in making this cut.

R-619 shows a 2½ yd. Amsco renewable lip dipper. Note simplicity and security with which lip is fastened to body.



and trucked to a repair shop, there to have the rivets cut or burned off and the new lip riveted on. Either a spare dipper had to be available or the shovel would shut down until the old dipper was returned, a

when desirable, welding as well. Rivet holes are countersunk inside, and there are no pockets or obstructions to encourage clay building so that loading and dumping are fast and complete.

Amsco Conservation Welding Materials fight wear and restore worn dippers. Send for Bulletin 941-W.

AMSCO
AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Illinois
FOUNDRIES AT CHICAGO HEIGHTS, ILL.; NEW CASTLE, DEL.; DENVER, COLO.; OAKLAND, CALIF.; LOS ANGELES, CALIF.; ST. LOUIS, MO.
OFFICES IN PRINCIPAL CITIES

AMERICAN
Brake Shoe
COMPANY

Pin-Up Girl

(Continued from page 86)

extra gang foreman when setting the I.C. crossing, who had us each and severally whipped until Karl put him *hors de combat* with a round-house swing and a 1¼ in. track bolt wrapped up in his fist. I understand that Karl some time since crossed the "Big Traverse."

This junior aide in the Alabama State Highway Department is O.K. from the neck up, too. Your head was covered with a cap and flaps during the zeros of 1905, besides ear muffs half as big as a mince pie—and so were your ears. Though you had a cold head, I knew your heart was warm. That was you.

But this gal, Frances Lindsey! Well, she could have been our transitman any time, eh, Slim? We could 'pick' em, couldn't we? You and I in 1905.

I'll be seeing you again sometime—anytime—maybe over there behind those shadows.

So long,
"Kink"

Serving the Services is a HIGH HONOR

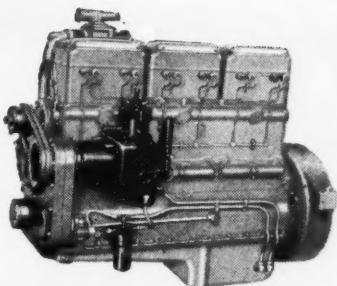
WHITE TRANSITS and LEVELS
are doing an outstanding job throughout the World

TYPE II U.S. ARMY TRANSIT

- ACCURACY • PRECISION
- DEPENDABILITY

Recommended for precise Municipal, Railroad, Highway and Bridge Work.

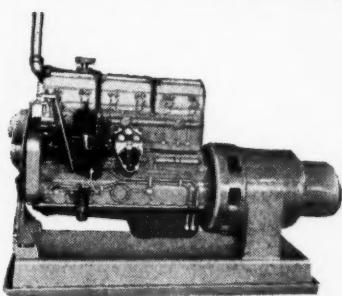
DAVID WHITE CO.
315 W. Court St. Milwaukee 12, Wis.
• Send for Bulletin 1039



The six-cylinder, 150 hp. Model HBI-600 Cummins Diesel is a portable industrial version of the Model H engine . . . the *original* high speed diesel. It is designed for heavy-duty shovels, cranes and numerous other types of wheel and track mounted dirt moving or material handling equipment in the construction and aggregates fields.



Model HP-600 Cummins Diesel is an enclosed power unit and is the same engine, basically, as the Model HBI-600, having the same horsepower rating. Like all Cummins Diesels, this model has earned acceptance among contractors and aggregates producers by its economy, quick cold-weather starting and its rugged dependability.



For generating service as well as for direct diesel drive, you can rely on Cummins Dependable Diesels for reliable, low-cost performance. Model HGA-601 (AC) and Model HGD-601 (DC) Cummins Diesel Generating Sets are offered with two ratings: 35 kw. at 900 rpm., and 50 kw. at 1200 rpm. Other models are manufactured in capacities ranging from 15 to 125 kw. Illustrated is the Model HGA-601.

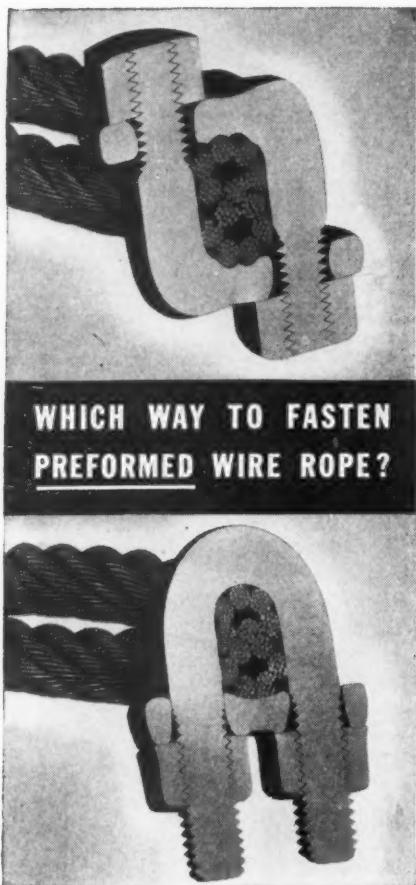
Makes the tough jobs look easy

If yours is a dirt moving or material handling job that demands rugged, heavy-duty power the clock around, then Cummins Diesel power is the power for you. Contractors and aggregates producers who have standardized on Cummins Diesels will attest to their low operating and upkeep cost, their flexibility and quick, cold-weather starting, their dependability, and long life . . . will tell you that Cummins Diesel power makes the *tough jobs look easy*. For your new equipment, plan now to specify Cummins Dependable Diesels.

CUMMINS ENGINE COMPANY, INC., Columbus, Ind.



SINCE 1918...PIONEER OF PROFITABLE POWER.
THROUGH HIGH SPEED DIESELS



WHICH WAY TO FASTEN PREFORMED WIRE ROPE?

The cross-section views show what happens to wire rope. In Fig. 1, Laughlin's "Fist-Grip" Safety Clip holds the $\frac{5}{8}$ " rope with hardly any distortion (note hemp centers). In Fig. 2, hemp center under U shows how rope is squeezed and flattened by U-bolt's smaller bearing area and "Finger-Pinch". Both were tightened to same tension by torque-indicating wrench.



Here's Why "Fist-Grip" Clips Work Better

Laughlin Safety Clips have identical saddles, flat sides; hold rope firmly without crushing. Saddles fit snugly against "live" and "dead" ends. Fewer clips deliver full rope power. The only clips with drop-forged bolts. Test them, for your rope's sake.

Distributed through mill, mine and oil field supply houses. Write for catalog. Dept. 1, The Thomas Laughlin Co., Portland 6, Maine.

LAUGHLIN



THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS



NEWS FROM MANUFACTURERS About Their Products

The publications reviewed below will keep you posted on latest developments in construction equipment and materials available for your use.



DRAGLINE BUCKETS—**Daniels-Murtaugh Co.**, 625 C Ave., West, Cedar Rapids, Iowa. (24 pp. illustrated). Illustrates and describes complete line of Dragline dragline buckets made in four types, heavy-duty, medium-duty, all-purpose and light-duty, and distinguished by their round manganese steel bumpers which prevent the arch from hitting the ground when the bucket is dropped. Other features include the "flat top" arch which is flat across the top despite the angle at which it is welded to the body, eliminating binding of material being loaded or dumped, and the three-way hitch which gives three positions of the dump hitch, for fast dumping, average work and precision dumping, respectively. Catalog also describes fabricated "Coaloader" dippers, and DMCO teeth for dragline buckets and dippers of all makes. Manganese steel chains, fittings and accessories for use with all dragline buckets also are catalogued.

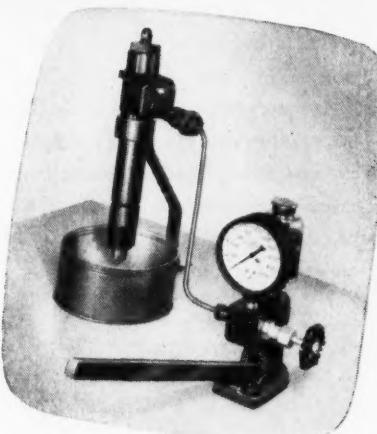


POST-WAR PLANNING—**Armco Drainage Products Assoc.**, Middletown, Ohio. (Two 4-p. folders) These folders, (1) "Suggestions and Useful Data for the Better Community you are Planning," and (2) "Suggestions and Useful Data for Those Modern Roads You are Planning" are similar in content but the first is intended for municipal readers and the second for highway and other readers. These publications catalog briefly the problems confronting engineers and officials in connection with post-war plans and construction. Suitable "Armco" products for meeting these problems are illustrated, along with brief descriptions, advantages and available design literature.



BANDING AND SPLICING ELECTRICAL APPLICATIONS—**The B. F. Goodrich Co.**, Akron, Ohio. (6 pp., illustrated). Describes Punch-Lok method of performing these operations and the tools used, lists sizes of preformed and open end clamps available in Everdur, a copper brass alloy for electrical use, and tells in step-by-step detail how to apply Punch-Lok bands on many electrical jobs such as connecting, splicing, reinforcing, tying and repairing lines.

ADECO NOZZLE TESTER



KEEP DIESEL ENGINES RUNNING AT PEAK EFFICIENCY



With this sturdy, portable, light-weight Adeco Nozzle Tester, any mechanic can easily make quick, accurate tests on injector opening pressure, spray pattern, etc., and detect stuck needle valves and leakage around valve seats. Adeco advantages have made this America's most widely used nozzle tester. Tests both large and small injectors, on bench or engine. Avoids costly delays and possible damage to engine. Keeps diesels operating at peak efficiency.

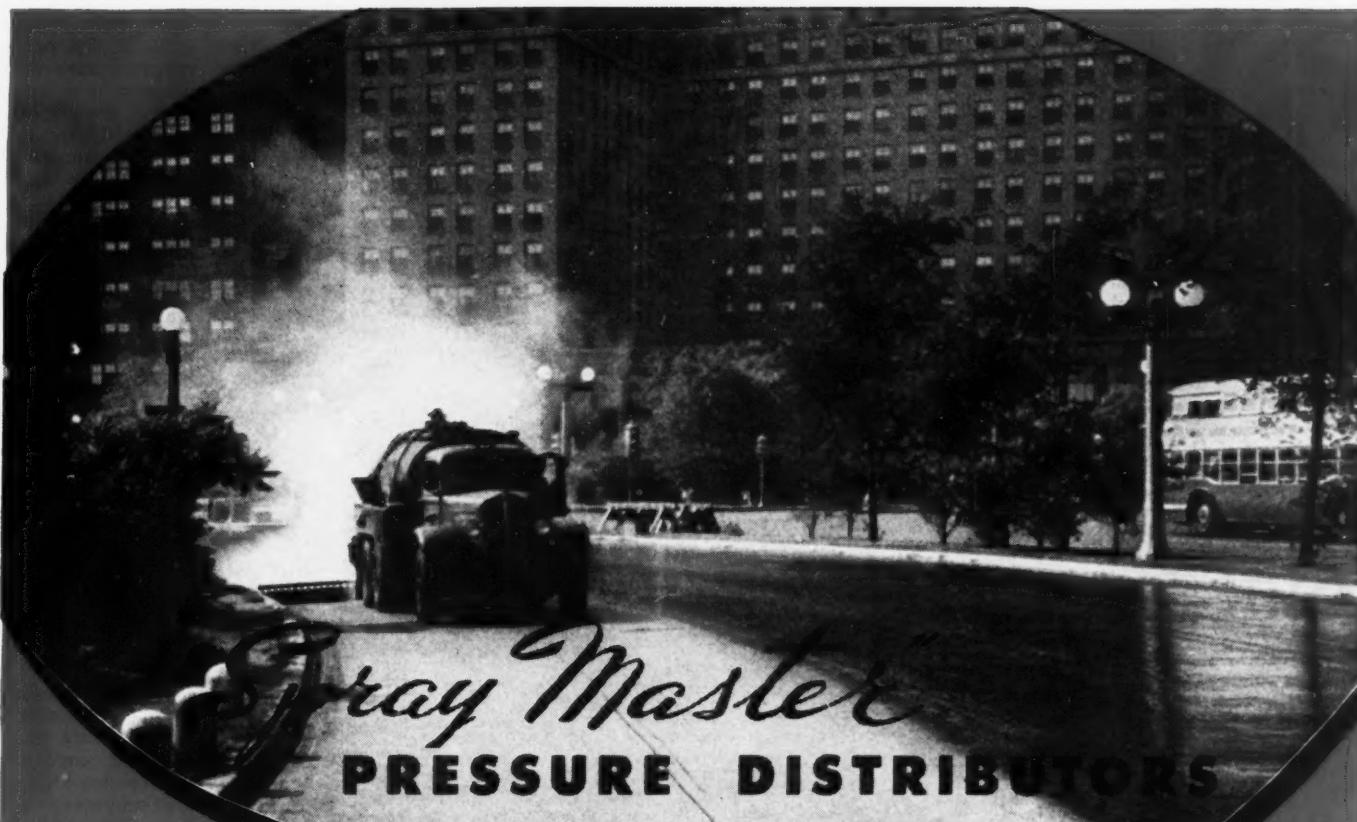
Write for new illustrated bulletin.



**AIRCRAFT & DIESEL
EQUIPMENT CORPORATION**

4411 NORTH RAVENSWOOD AVENUE

CHICAGO 40, ILLINOIS



Spray Master PRESSURE DISTRIBUTORS



"Spray Master" spraying Asphalt on an Airport Runway somewhere in the South Pacific.



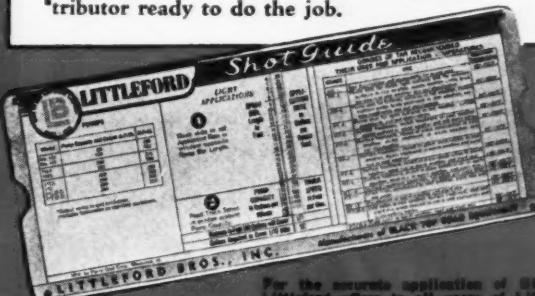
A typical view of the "Spray Master" at work spraying a Highway.

When it comes to spraying Asphalt, Tar, Road Oils, or Emulsions, the "Spray Master" cuts the cost of operation.

The "Spray Master" is not an ordinary Pressure Distributor, but a designed spraying unit that incorporates years of research and actual road work under all conditions. Features found on the "Spray Master" are exclusive Littleford design and are offered as standard equipment.

"Spray Master" Distributors are made in Front or Rear Engine mountings with Standard or Circulating Spray Bars up to 24 feet in width.

Be ready for the Big Road Building Program, have a "Spray Master" Pressure Distributor ready to do the job.



For the accurate application of Bitumen, Littleford offers to all users of Littleford Black Top Road Equipment a "Shot Guide" free. Write today.



LITTLEFORD

LITTLEFORD BROS., INC.

465 E. PEARL STREET

CINCINNATI 2, OHIO

Guard this Infection Line

With this
Vital Health Defense



Here's a way to help guard your men against such epidemics as colds and "FLU." With single-use Dixie or Vortex Cups you check the spread of dreaded disease germs. The Dixie Portable Water Carrier, with individual paper cup service, does away with these dangers of the old "bucket and dipper" days.

KEEPS MEN AT WORK

Cut out trips to the water wagon, and you cut out hundreds of lost man-hours—time squandered in "visiting"

and otherwise wasted. Let Dixie Portable Water Carriers help you step up schedules and beat those contract dead-lines.



Write for descriptive folder giving complete information on this portable water service, including tanks, dispensers and cups.

Dixie and Vortex Cups are made at Easton, Pa., Chicago, Ill., Darlington, S. C., and Toronto, Canada

DIXIE CUPS

DRINKING CUPS AND FOOD CONTAINERS

CORROSION—The International Nickel Co., Inc., 67 Wall St., New York 5, N. Y. (54 pp., illustrated). Convenient and comprehensive analysis of corrosion principles for practical man and technician in metal field. Opening section explains how corrosion processes work and discusses all known factors that influence their action. These discussions are illustrated with graphs, drawings and tables. Detailed review of testing methods that follows tells how service conditions are simulated in corrosion research. Included is a description of the construction and use of the well-known spool-type specimen holder for determining comparative behavior of several metals and alloys simultaneously under actual operating conditions. Applicability of Monel, nickel and Inconel in various corrosive media is analyzed in closing section.

★ ★ ★



CONCRETE MIXERS—Chain Belt Co., 1600 W. Bruce St., Milwaukee, Wis. (12 pp., illustrated). Describes and illustrates line of concrete mixers manufactured by this company for construction industry ranging from 3½- to 28-cu. ft. capacity and gives a resume of operating features and complete specifications. One page devoted to pictures of other Rex

products—centrifugal water pumps for efficient, economical moving of water; road pavers; high discharge and horizontal Moto-Mixers for speeding up mixing, hauling and placing of concrete, mortar and plaster mixers and Pumpcrete, the concrete pump.

★ ★ ★

VERTICAL MULTI-STAGE PUMPS—The Byron-Jackson Co., Pump Div., Terminal Annex, Los Angeles 54, Calif. (8-p. bulletin, illustrated). Describes this unit designed for handling liquids, hot or cold, corrosive or non-corrosive, where net positive suction head is limited. Contains illustrations of this pump handling light petroleum fractions, in condensate return service and for heater drip pumping. Construction detail is shown, standard specifications are given as well as dimensions of various standard sizes. Capacities of these standard sizes are to 1,000 gpm., against heads up to 250 psi., but pumps are available on special order to 5,000 gpm. and for sub-zero temperatures or to 750 deg. F.



TUBES AND CASING RE-PAIRS—J. W. Speaker Corp., 3059 N. Weil St., Milwaukee 12, Wis. (16 pp., illustrated). An interesting and informative book that reviews the history of the company and features products available to the trade today, among them tubes and casing repairs for both natural and synthetic rubber and also Heatabs, concentrated heating units for camp stove cooking.



WOOD'S **Moly** SHOVELS receive their

Ruggedness
from the Rockies

...where magic MO-LYB-DEN-UM is mined

WOOD'S Moly Shovels, Spades and Scoops have really magical qualities of toughness, hardness, and wear-resistance. These exceptional qualities are derived from the special Mo-lyb-den-um alloy steel, (made to Wood's own special analysis) used in the blades of these truly super tools.

WOOD'S development of Mo-lyb-den-um alloy steel for shovels has been so outstanding as to earn the exclusive right for world-wide use of the name Moly.

Buy these better tools for toughest jobs where ordinary shovels don't stand up. Moly Shovels are unconditionally guaranteed to out-wear, out-last any shovels made.

THE WOOD SHOVEL AND TOOL CO.
PIQUA, OHIO

A National Organization Specializing
Exclusively in Shovels, Spades and Scoops.

Moly

REG. U.S. PAT. OFF.

MO-LYB-DEN-UM

ALLOY

SHOVELS



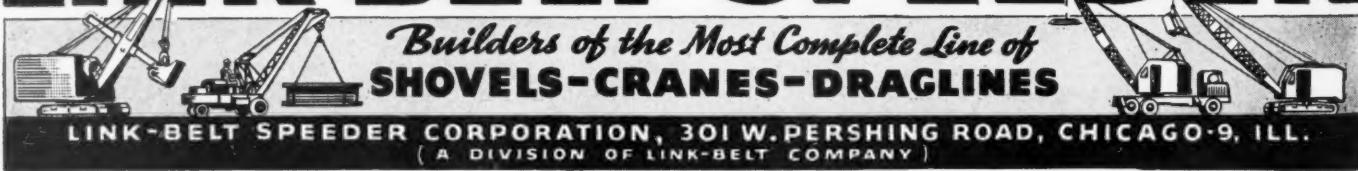
GETTING DOWN
TO WORK
with Plenty of
SPEED--
AND POWER
TO GO DEEP!

GET A BIG
BITE
with a LINK-BELT
SPEEDER

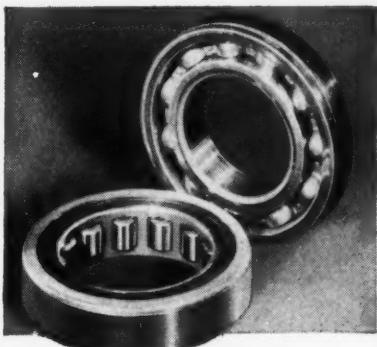
- Seventeen feet below the level, this LINK-BELT SPEEDER equipped with trench hoe, is making time on a precision ditch. Roots, rocks, clay or gravel, they're all the same to this powerful, efficient machine. Weight, balance and finger-tip control enable the operator to do better work, faster, with minimum time or attention for upkeep.

For Prompt, Efficient, Convenient Sales and Service, There
is a Link-Belt Speeder Distributor Located Near You.

LINK-BELT SPEEDER



BALL BEARING LUBRIPLATE



FOR ALL TYPES OF ANTI-FRICTION BEARINGS

BALL BEARING LUBRIPLATE is a single grease type lubricant developed for general use on roller, ball and plain sleeve bearings operating at speeds up to 5000 RPM and at temperatures up to 300° F. Its performance is outstanding. **BALL BEARING LUBRIPLATE** not only does a better lubrication job, but it definitely gives protection against the arch enemy of bearings . . . corrosion. Increase the life of your bearings with **LUBRIPLATE**.

LUBRIPLATE

Lubricants definitely reduce friction and wear to a minimum. They lower power costs and prolong the life of equipment to an infinitely greater degree. **LUBRIPLATE** arrests progressive wear.

LUBRIPLATE

Lubricants protect machine parts against the destructive action of rust and corrosion. This feature alone puts **LUBRIPLATE** far out in front of conventional lubricants.

LUBRIPLATE

Lubricants are extremely economical for reason that they possess very long life and "stay-in-place" properties. A little **LUBRIPLATE** goes a long way.

Write for a booklet, "The **LUBRIPLATE Film**", written especially for your industry.

LUBRIPLATE

FISKE BROTHERS REFINING CO.

NEWARK 5, N. J.
TOLEDO 3, OHIO

OUR 75TH YEAR
1870-1945 DEALERS FROM COAST TO COAST



DRESSERS FOR BLAST HOLE DRILL BITS—**Bucyrus Erie Co.**, South Milwaukee, Wis. (24 pp. illustrated). Fully illustrated with photographs, explanatory drawings, and diagrams of efficient shop layouts, this two-color booklet tells how the driller can get faster dressing for his bits with less waste of steel, and with fewer sharpenings by using the No. 8 for bits up to 6½-in. diameter and the No. 12 for bits up to 12-in. diameter. One of the particular advantages of the bit dresser which practically eliminates the sticking of tools and fishing jobs is its accurate shaping, and the uniformity of its production regardless of the operator's skill. Bulletin also includes photographs and descriptions of three other pieces of equipment useful to the driller—bit furnaces, quenching tanks and bit handling cranes.

★ ★ ★

DIRECT-FIRED WARM AIR HEATING—**Dravo Corp.**, Dravo Bldg., 300 Penn Ave., Pittsburgh 22, Pa. (16 pp. & cover, illustrated) Booklet entitled "Portfolio of Outstanding Engineering in Industrial Heating" describes the direct-fired warm air method of heating and illustrates many of the great war structures which are heated by this method, including 35-acre Bomber Modification Center at Birmingham, Ala., numerous ordnance depots, tank arsenals, Naval warehouses and the corrugated sheet steel Quonset huts used by the U. S. Armed Forces at advance bases. Shipped from the factory ready for use, these compact units may be moved from place to place during construction and then retained as a permanent system when building is completed. They can be installed in out-of-the-way plant areas to provide supplementary heat; they can be arranged as self-contained units in an existing plant to give heat direct, without recourse to ducts; they can be hung from the walls when floor space is not available, and they can be installed in plenum chambers to provide an efficient central heating plant with the heat distribution handled by duct system. Portfolio shows a number of these installations and gives the requirements that suggested each.

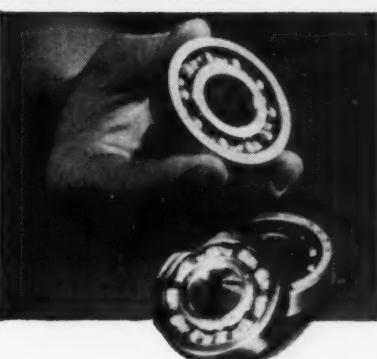
★ ★ ★

AUTOMATIC VALVES AND PRESSURE CONTROLS—**A. W. Cash Manufacturing Co.**, Decatur, Ill. (28-pg. catalog). Features detailed information and specific data on complete line of Cash-Acme automatic valves and pressure controls for use with water, air, steam and oil.

★ ★ ★

DIESEL ENGINES—**Caterpillar Tractor Co.**, Peoria, Ill. (32 pp., illustrated). Pictured in this new booklet are some of the tasks these machines are doing on the home front. Applications are many and varied and include taking over an airport load when an emergency arises; powering boats, lighting municipalities; providing lights and power for service stations, repair shops, roadside stands, auto courts, hotels, hospitals, sawmills, oil fields (drilling, pumping, etc.) and mines.

LUBRIPLATE No. 205



MAKE ONE BEARING OUTLIVE TWO

LUBRIPLATE No. 205 is a lubricant developed for use in grease type anti-friction bearings operating at speeds from 5000 RPM to 20,000 RPM. Users of high speed machinery tell us that this remarkable lubricant often more than doubles the life of bearings. For the lubrication of anti-friction bearings with oil type housings **LUBRIPLATE No. 1** or **No. 2** is recommended depending upon the operating speed.

R FOR YOUR MACHINERY

No. 3—Ideal for general oil type lubrication. Ring oiled bearings, wick feeds, sight feeds and bottle oilers.

No. 8—Because of its high film strength and long life reflects outstanding performance in most types of enclosed gears (speed reducers).

No. 107—one of the most popular grease type products for general application by pressure gun or cups.

No. 70—for a wide range of grease applications, especially at temperatures above 200 degrees F.

No. 130-AA—Known nationwide as the superior lubricant for open gears, heavy duty bearings, wire rope, etc.

BALL BEARING—This is the **LUBRIPLATE** lubricant that has achieved wide acclaim for use in the general run of ball and roller bearings operating at speeds to 5000 RPM and temperatures up to 300 degrees F.

Write for a booklet, "The **LUBRIPLATE Film**", written especially for your industry.

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**Handle More Tonnage
Longer
with REPUBLIC
Conveyor Belts**

Long Service

LIFE and lowest cost per ton are economies achieved by Republic belting on many jobs handling rock, raw materials and aggregates, earth and spoilage. Through technological advances in synthetic rubbers, this heavy duty belting has been recently improved — it is now "better than before." Record Maker-S and Super Excelo Reprene are quality belts engineered for this service, similar in structure, differing in synthetic compounds and resultant service characteristics. Super Excelo Reprene is constructed with oil-and-heat-resisting synthetic rubber and is recommended for its bonding against ply separation and additional resistance to abrasion, wear, tear, and fatigue. Ask your nearby Republic Distributor about improved Republic Conveyor Belts.



**BETTER
THAN BEFORE**

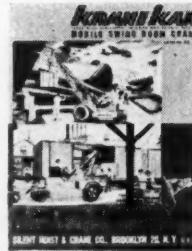
REPUBLIC RUBBER

DIVISION
LEE RUBBER & TIRE CORPORATION
YOUNGSTOWN, OHIO

REPUBLIC INDUSTRIAL PRODUCTS
YOUNGSTOWN, O.



LEE DELUXE TIRES AND TUBES
CONSHOHOCKEN, PA.



MOBILE SWING BOOM CRANES — Silent Hoist & Crane Co., Brooklyn 20, N. Y. (24 pp., illustrated). Describes and illustrates new "Krane Kar," gasoline or diesel engine driven power swing boom crane, with front wheel drive and caster-type rear wheel, self-propelled on rubber-tired wheels, capable of traveling with load on hook over irregular ground. Control for traveling and for all crane operations is by one operator in normal driving seat. Lists unusual advantages: (1) More load, better traction; (2) steering always easy; (3) three-point ground contact permits all wheels to be solidly on ground at all times; (4) no stabilizers are required when swinging loads to side positions; (5) any load that can be lifted can be transported; (6) sharp maneuvering is possible. Photographs showing various uses of Krane Kars and extra equipment available for use with these units.

Working tv.
1150 h.p.
this 2,275,
airport job.

★ ★ ★

ACID-PROOF BRICK FLOORS — The Belden Brick Co., Canton, Ohio (16 pp., illustrated). Describes new, permanent acid-proof brick floor claimed not to crease, groove, chip, dust off or require patching. Bonded with acid-proof cement, this floor is said to repel organic, physical and chemical attack, to hold up under the cutting action of steel wheeled trucks, to resist oil, water, acids and to have a crushing strength of 18,500 lb. to the square inch. Brochure gives complete instructions for installation with special acid-proof cement. Easy to flush and clean, brick are furnished with smooth and non-skid surfaces.

★ ★ ★

PLASTIC COATERS — The Youngstown Miller Co., Sandusky, Ohio. (6-p. bulletin). Describes operation and exclusive features of these machines designed to melt ethyl cellulose compound and other plastic coatings used for protecting parts and tools being stored or shipped overseas. Same equipment is also used for melting low temperature plastics used for permanent coatings. Twenty-two different models with a wide range of dipping compartment sizes and melting capacities are available.

21 other L
30-heaped-
hauls, Dozer

★ ★ ★

PREFORMED WIRE ROPE — Preformed Wire Rope Information Bureau, 520 N. Michigan Ave., Chicago, Ill. (36-p., illustrated). Lists and explains a few of the uses to which wire rope has been put in World War II and graphically portrays those uses in ninety photographs with explanatory captions. Permanent record not only of the vitality of a single, little-thought-of piece of equipment but of the usefulness of American labor in steel, wire and rope mills throughout the country.



Here are M
previous Pitts
609 miles in
freight costs.

YOU'LL HAVE **TOURNAPULLS** TO BEAT ON TOMORROW'S LONGER HAULS



Working two 10-hour shifts, Frank Mashuda Co.'s 1-150 h.p. Super C Tournapulls helped rush through this 2,275,000-yard Mansfield, Ohio, municipal airport job.



21 other LeTourneau units on this job included 30-heaped-yard, crawler-drawn Carryalls for short hauls, Dozers and Rooters.



Here are Mashuda's 7 Super C's enroute from a previous Pittsburgh job to Madison, Wisc., traveled 609 miles in 50 hours' driving time, saved half on freight costs.

HERE'S WHY:

TOURNAPULLS FIT LONG-HAUL TREND

On Frank Mashuda Company's contract for Mansfield, Ohio, Airport, grading for two 5600 by 150' runways with taxiways, drainage, etc., required hauls which ran 7200 feet round trip when these pictures were taken. On these long hauls, Mashuda used 7 15-heaped-yard Tournapulls; with 7 30-heaped-yard tractor-drawn Carryalls on shorter 1200-foot round trips.

HIGH SPEED CUTS COSTS

Tournapulls' top speed is 14.9 m.p.h., while crawling tractors do only 7 or less at their best. Because of Tournapulls' large-diameter tires, overall cycles average 2 to 3 times faster than the fastest crawling tractor. This means lower-cost dirt, quicker completion.

SAVE IN SHALLOW AS WELL AS DEEP CUTS

Revolutionary low costs with Tournapulls are the same whether cuts are a few inches, a few feet, or 100 feet deep. Tournapulls move any yard of top dirt any time you want it, eliminate shovel move-up delays and wasteful rehandling.

HAUL ON AND ACROSS PAVEMENT

Tournapulls' big low-pressure rubber tires (21.00 x 24) carry their loads over pavement without surface damage. No protective planking or dirt cover is needed. Also note, Tournapull with 15-heaped-

yard Carryall carries 22,500 lbs. less deadweight than a crawling tractor with same size scraper.

ACCURATE, COMPACTED SPREAD

Tournapulls power rugged LeTourneau Carryalls, proved in service by over 26,000 units. Positive, load-ejector tailgate, with independent apron control, insures smooth, accurate spreading. Big tires compact the fill, permit prompt paving.

LESS WEARING PARTS . . . MORE TIME ON JOB

Tournapull is the simplest of all dirtmoving tools. Compared with crawling tractors, its two big rubber-tired wheels take the place of crawlers having more than 500 wearing parts. This means low-cost maintenance, less time out for repairs.

SAVES BY SELF-HAUL BETWEEN JOBS

Tournapulls need neither flat-cars nor flat-bed trailers to move from job-to-job. Alert Tournapull owners, like Mashuda, take advantage of their ability to travel over highways, save blocking, loading and switching time, freight bills.

Plan NOW for Tomorrow's Jobs

Investigate the job-proved earthmoving economies offered by Tournapulls on your airports, highways, dams, levees . . . mine and quarry stripping . . . sand and gravel operations. Get acquainted with your LeTourneau Distributor. He'll be glad to help you with your equipment plans.

LETOURNEAU
PEORIA, ILLINOIS • STOCKTON, CALIFORNIA

TOURNAPULLS

Manufacturers of TOURNAPULLS*, ANGLEDODZERS*, BULLDOZERS, TILTDOZERS*, CARRYALL* SCRAPERS, POWER CONTROL UNITS, ROOTERS*, TOURNA-TRAILERS*, TOURNAKRANES*, TOURNAUTRUCKS*, SHEEP'S FOOT ROLLERS, TOURNAPOPE*, TOURNAWELD*, TOURNALIFTS*.

* Trade Mark Reg. U. S. Patt. Off. ML2



Over 2700 Built & Shipped

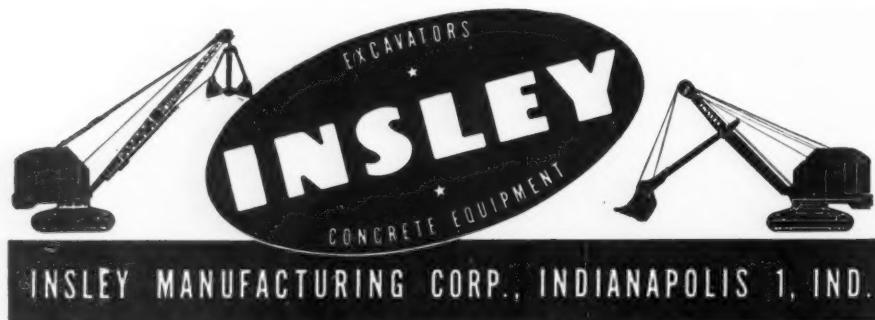
RUBBER-TIRED POWER FOR FASTER EARTHMOVING



No Tipping

The Insley Excavator's unusual hook roller construction offers two outstanding advantages. Three hook rollers are provided to secure the revolving frame to the lower frame. Their location, one in front and two in the rear, prevents the revolving frame from tipping . . . assures proper balance on rough ground and under heavy load. More than that, this hook roller construction also extends the life of the equipment because it relieves the center pin of all vertical stress . . . requires it to take only the horizontal shear load.

As in this one particular instance, you'll find that every detail of Insley's design and construction makes an important contribution to dependable, low-cost performance on the toughest jobs—dirt, rock or what have you! That's why it will pay you to get all the facts on $\frac{3}{8}$ and $\frac{1}{2}$ -yd. Insley Type K Excavators.



Barricaded Sidings

(Continued from page 78)

out of the siding, completing the side walls as it moves along.

After pouring has been completed in one spur, the crew and equipment moves to the next spur and the operation is repeated. Ordinarily the 350 cu. yd. in the side walls is poured in a single continuous operation.

After the concrete has cured and bolts are removed, a crane moves into the siding to lift out the form panels. It begins at the outer end of the spur and when it has progressed to the inner end and all the inside panels have been taken out, work begins on the outside wall. The panels are laid on the bed of a truck for delivery to the form yard where they are reconditioned, oiled and made ready for the next use.

At one of these barricaded siding yards, where the accompanying pictures were made by a representative of this journal, the contract was held by the Sound-Kiewit Co., formed for this job as a con-

(Continued on page 148)

Shunk
Superior Quality
BLADES
AND CUTTING EDGES

For any make of machine
Motor Graders, Maintainers, Scrapers, Drags, Bulldozers, Backfillers, Wagon Scrapers, Trail Builders, Trail Blowers, Carryalls, Also—

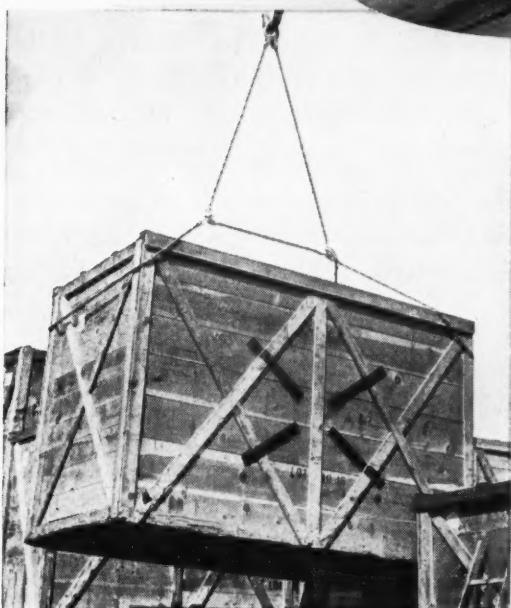
CUTTING EDGES
WEARING BOOTS
BACK SLOPERS
EXTENSION BLADES
MOLDBOARDS
and
SCRAPFER TEETH

50 years of manufacturing blades has developed for you a special steel, rolled through our own rolls and forged at the edges to give that extra wearing quality you need.

All widths, lengths, and thicknesses, punched ready to fit your machine.

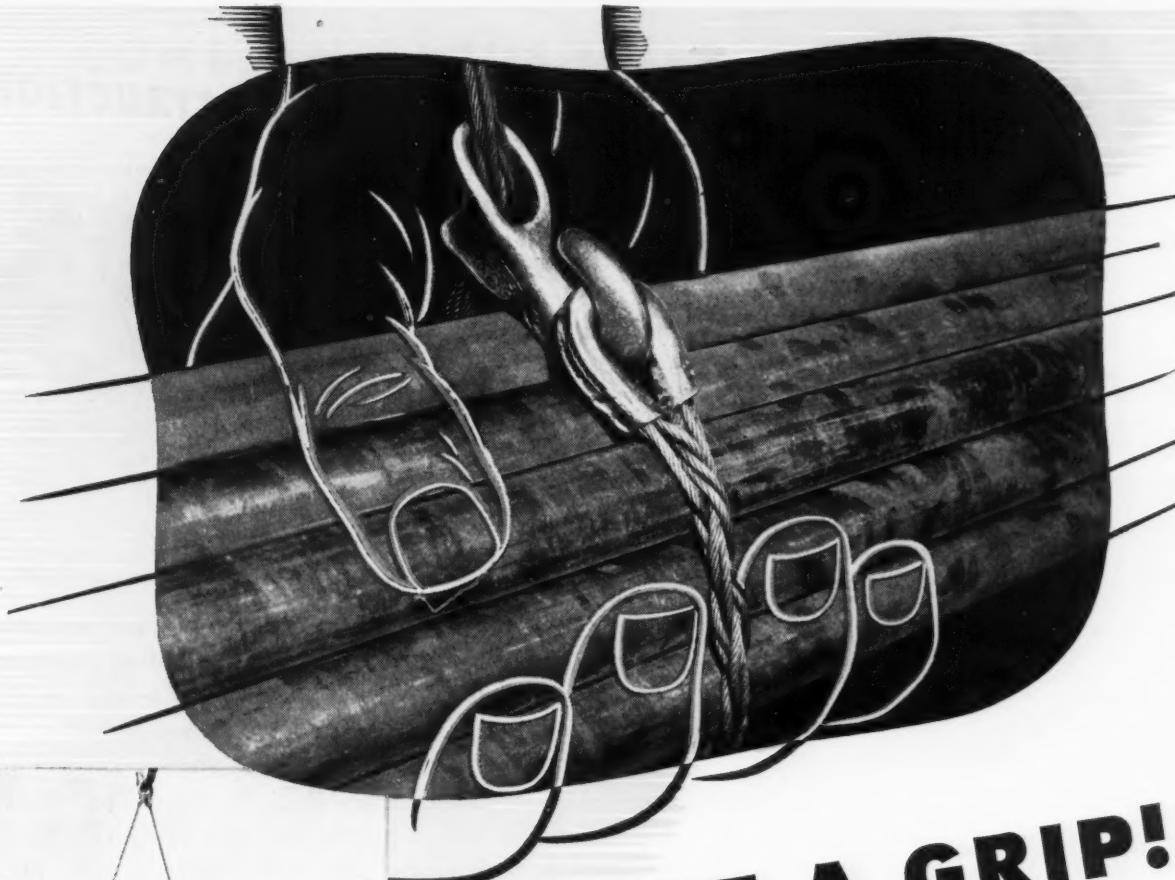
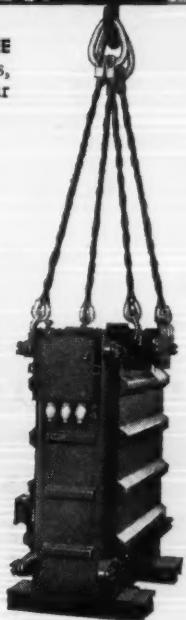
Consult your internationally recognized Blade Specialists. Write for special bulletins, giving type and name of machines you operate—get set for Blades early.

Shunk
MANUFACTURING COMPANY
Established 1854
BUCYRUS, OHIO,
Member of A.E.D.



RIGGERS' HAND BOOK FREE
Shows sling types, fittings,
capacities. Write for your
copy.

*PATENTS: U. S., 1475689, 1524671,
2142641, 2142642, 2299568;
CANADIAN, 252874, 258068



WHAT A GRIP!

Handle loads safely...economically
with **YELLOW STRAND BRAIDED SLINGS***

A lot of industries have taken a fresh hold on the sling question as a result of war production. And what a grip they get by using the adaptable Yellow Strand Braided Safety Sling! After handling just about every extreme in lifts — from multi-ton ship sections, tanks and guns to light-weight parts, jigs and crates — this improved type of sling is today primed to speed your assembly line, shop or field operations.

Tough Yellow Strand Wire Rope provides the sling's strength. The patented *braiding* adds flexibility, kink-resistance and a snug grasp on odd-shaped, rounded or slippery objects. The combined result is a time-and-labor-saving sling with less weight and bulk than chain of like capacity...with limberness well suited to former Manila rope jobs...with security that safeguards both employees and loads.

Properly fitted, Yellow Strand Braided Slings will give long-lived, economical service. Send details of your application now and let B & B engineers offer a recommendation. Broderick & Bascom Rope Co., St. Louis 15, Mo. Branches: New York, Chicago, Houston, Portland, Seattle. Factories: St. Louis, Seattle, Peoria.

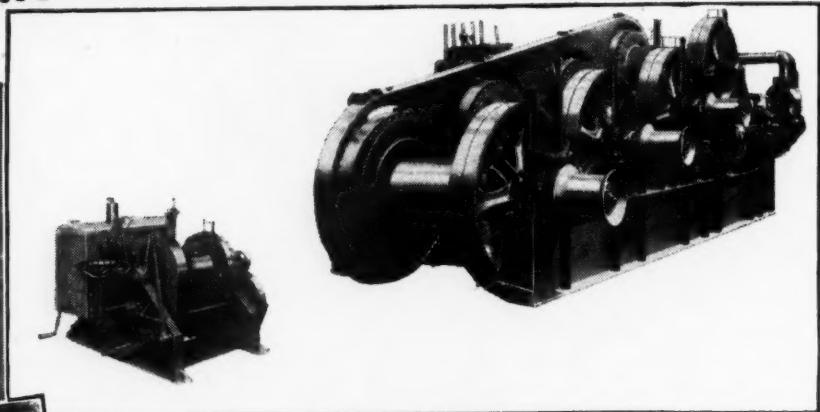


American

MATERIALS HANDLING FOR EVERY CONSTRUCTION JOB

GASOLINE
DIESEL
ELECTRIC
STEAM

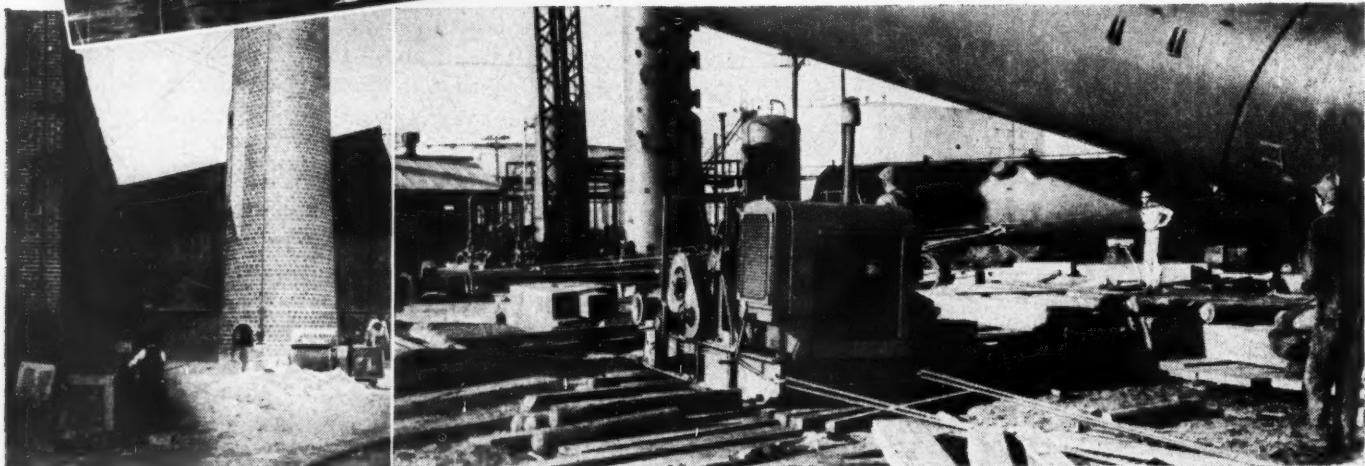
HOISTS
HOISTS
HOISTS



What size and type of hoist are you going to need to bring your materials handling equipment into line for the new construction work? A little, one-ton, single-drum hoist? A large, powerful, multiple-drum hoist for 250-ton derrick work and larger? Or a hoist somewhere in between? In this most complete line of hoists, there is a proved, AMERICAN Hoist for whatever your requirements in line pull, speed, type of power, and operating convenience.

Now is the time to look to your hoist requirements. Now is the time to see what the AMERICAN Hoists can do for you later.

4506



Plan now... but wait for AMERICAN!

AMERICAN

AMERICAN HOIST & DERRICK CO.

Saint Paul 1, Minnesota

CHICAGO

SAN FRANCISCO

MATERIALS HANDLING
for EVERY INDUSTRY

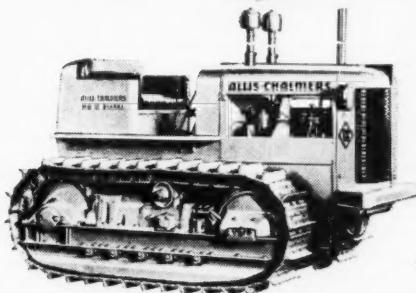
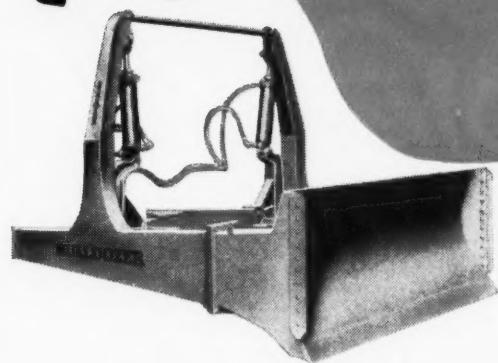
NEW YORK



Wherever
wire rope is fastened
use genuine
CROSBY CLIPS
with the Red-U-Bolt

LIKE A COMB AND BRUSH—

*They Go
Together!*



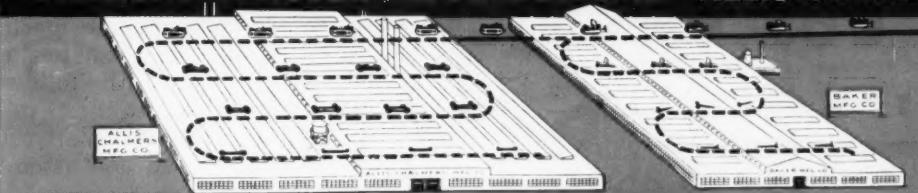
Baker Bulldozers + Allis-Chalmers Tractors = performance. Just like a bolt and a nut or a comb and brush go together—so do Bakers go with Allis-Chalmers Tractors. Every unit in the complete Baker Bulldozer and Gradebuilder line is "tailor-made" for installation on A-C Tractors—a model for every size crawler tractor.

Here are two organizations working side by side—each a specialist in its chosen field—giving you all of the benefits of a tractor-bulldozer unit "designed and made under one roof." From the very inception of a new tractor or tractor equipment, engineers of both firms confer on design and dovetail plans. Here, too, is a nationwide dealer organization equipped to render super-service on tractor and bulldozer alike. Thousands of users among contractors, public works officials and in many industries will verify that Baker Bulldozers or Gradebuilders and A-C Tractors go together!

THE BAKER MFG. CO.
568 Stanford Ave. Springfield, Ill.

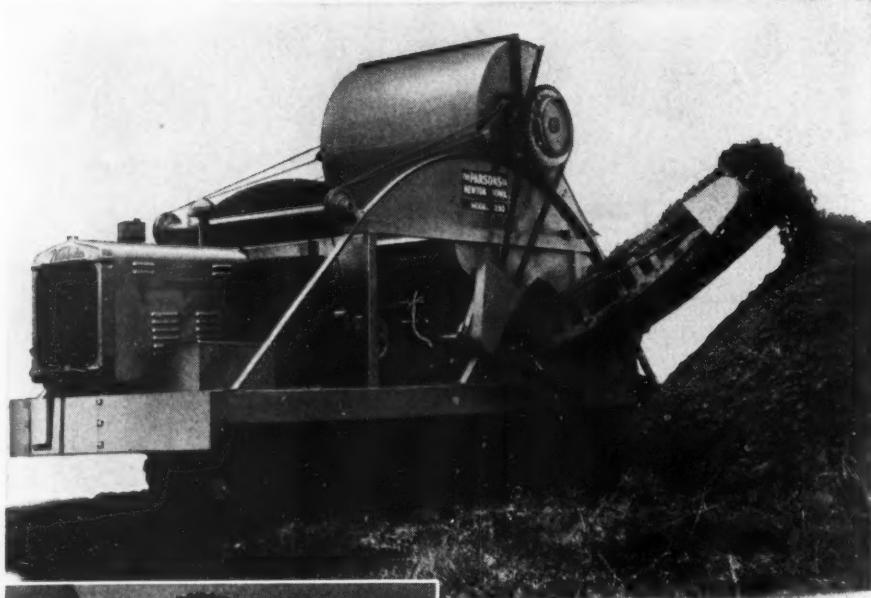
If it concerns Victory, it concerns us!

"STRAIGHT THROUGH" ASSEMBLY LINE - ALLIS-CHALMERS TO BAKER TO YOU!



The modern Baker plant with its completely equipped fabricating, machining and blacksmithing shops adjoins the Allis-Chalmers crawler tractor plant. When you order an A-C tractor with Baker bulldozer or gradebuilder, your tractor leaves the A-C assembly line, crosses a narrow court and goes on the Baker final assembly line.

PARSONS 250 TRENCHLINER



Band type safety clutch is spring loaded, easily accessible, quickly adjusted.

digging. Mounted directly on the excavator drive sprocket, it is automatic in operation, always on guard against breakage that might cause delay and expense. Maximum production continues without interruption because the overload clutch provides safety and flexibility.

● Large rocks or heavy roots, shock loads of any kind can't damage the Parsons 250 Trenchliner. Safety overload clutch slips and stops machinery when buckets hit impassable obstructions in the trench. Band type safety clutch is spring loaded, quickly adjusted to provide proper tension for any type of

THE PARSONS COMPANY

KOEHRING SUBSIDIARY NEWTON, IOWA

TRENCHING EQUIPMENT



(Continued from page 144)

solidation of the Sound Construction & Engineering Co., Seattle, and Peter Kiewit & Sons, Omaha. For the combined firm Ben Williams was general superintendent and Earle Todd, building superintendent. In charge for the Navy was Capt. E. B. Keating (CEC), USN, officer in charge of construction, and Lieut.-Comdr. E. F. Koerner (CEC), USNR, whose executive in the field was Lieut.-Comdr. Joseph C. Bronson (CEC), USNR. Otto Lunn was resident engineer for the Navy.

General supervision of all naval construction in this district is under Rear Adm. C. A. Trexel (CEC), USN, superintending Civil Engineer Area VIII. This area includes the states of Washington and Oregon and the Territory of Alaska.

★ ★ ★

C O M B A T

Cargo Ships

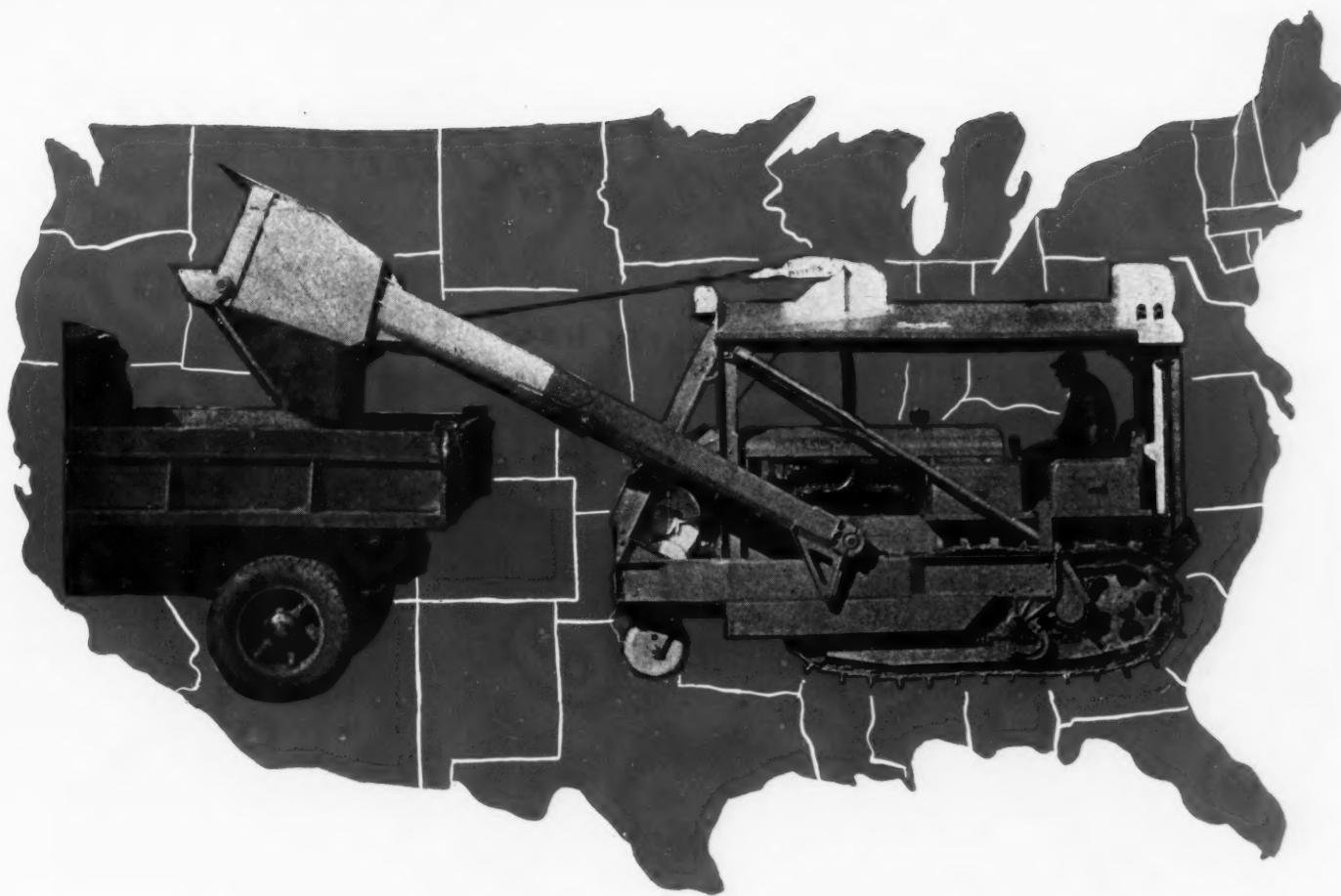
(Continued from page 65)

structing the hull piecemeal fashion on the restricted area of the shipways, as was the method formerly used. An indication of the amount of hull work accomplished in preassembly work is seen by a study of the relative amounts of welding done throughout various locations in the shipyard. Sub-assembly and final assembly account for more than 60 percent of all welding, whereas 30 percent is accomplished on the shipways and less than 10 percent at the outfitting pier after launching. In addition, piping work and installation of equipment is started on the platens, the result of constant effort to do more and more preassembly.

"Keel Laying" Superseded

Because of the preassembly feature, progress of construction of a hull on the shipways proceeds rapidly. Approximately 40 major assembly sections make one complete hull, although there are many small assemblies added to the hull during construction. Serving the dual purpose of permitting the machinery work to be started immediately and better welding sequences to be followed, the midship section is the first to be placed on the shipways. Formerly, before plans were developed and assembly

(Continued on page 151)



Here and There and Everywhere The Sargent Overhead Makes a Profitable One-Machine Business For Small Contractors

In the postwar years of tremendous construction and building programs the small contractors will thrive as well as the larger operators. The Sargent Overhead cut its eye teeth and toughened up on the hundreds of different jobs that will abound. . . . Like digging basements, loading sand and gravel, stripping topsoil, digging up and loading hard street surfacing, plain and fancy bulldozing, miscellaneous work along water and sewer lines.

The Sargent Overhead is easily moved from job

to job by truck, small trailer or under its own power. . . . It loads fast and in a direct line motion. . . . There is no twisting and turning to ruin crawler tracks. . . . It handles dripping muck or broken concrete with equal ease. . . . It makes no difference if ground is sloping. . . . And it takes only 15 minutes to change from loader to bulldozer.

All this adds up to a perfect unit for a small contractor. . . . Write us for literature which shows the Sargent Overhead on various kinds of digging, loading and bulldozing jobs . . . or contact your nearest Oliver "Cletrac" dealer.

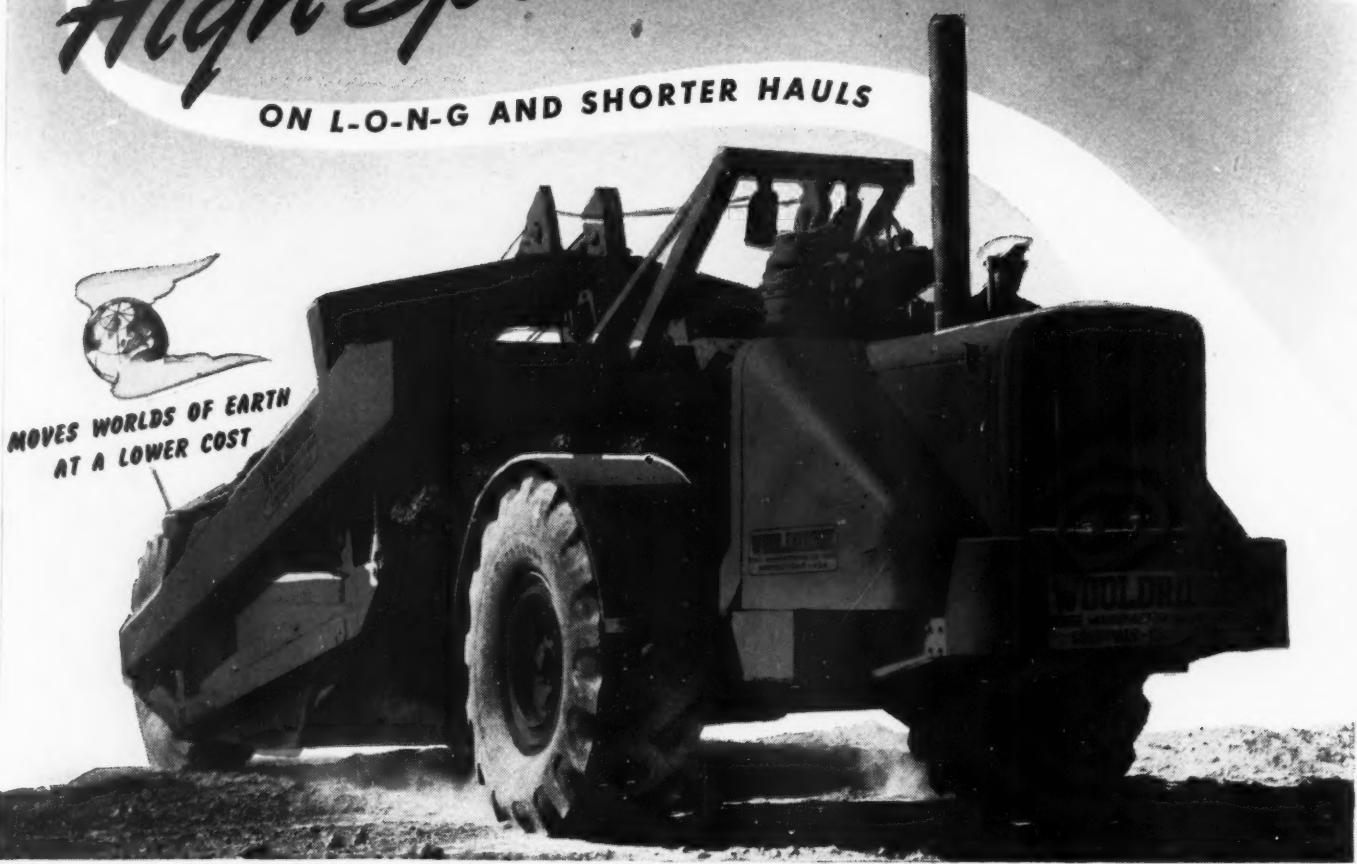
NOTE TO PUBLIC WORKS OFFICIALS

The Sargent Overhead will earn its keep in your department every month of the year. . . . Besides the operations listed above, which are your every day chores, The Overhead, when equipped with a 2½-yard bucket makes an efficient, fast and dependable one-man snow loader. . . . We'll be glad to send you a folder on "Loading Snow With The Sargent Overhead."

MAINE STEEL
INCORPORATED
SOUTH PORTLAND, MAINE

High Speed EARTHMOVING

ON L-O-N-G AND SHORTER HAULS



Combines Power and Speed With Positive Steering Control

Powered by a heavy duty diesel with four speeds forward and a reverse gear, Wooldridge Terra-Cobras attain travel speeds up to 21 M.P.H. on either short or long stretches. Surplus rim pull permits fast acceleration in a short distance and provides ample power to pull up comparatively steep slopes—fully loaded without a "pusher." Regardless of whether it is loading, traveling, spreading or turning, the Terra-Cobra maintains a fixed direction of travel due to positive two-wheel hydraulic steering control. Full traction and power is constantly applied and maintained on BOTH drive wheels, at all times . . . even on sharp turns. As no fatiguing effort is required to handle the Terra-Cobra, full production and higher average yardages can be expected from each operator on every shift. To combine speed with safety on your earthmoving operations rely on Wooldridge Terra-Cobras. Investigate fully, today.

WOOLDRIDGE MANUFACTURING CO. SUNNYVALE, CALIFORNIA

No Danger of "JACKNIFING"

It is unnecessary to slacken speed when traveling, spreading or turning in order to maintain safe control of a Terra-Cobra, as there are no steering clutches to fight nor individual brakes to grab. Positive two wheel steering eliminates any possibility of "jacknifing."



WRITE TODAY

For your copy of new Bulletin giving full details on Wooldridge Terra-Cobras. Ask for Bulletin TA-125.



(Continued from page 148)

sections built, a keel laying consisted of just the placing of one keel plate, weighing about 1 ton. The name "keel laying" still sticks today, although the first unit is now a double bottom section 30 ft. long, 50 ft. wide and about 4 ft. deep, with all piping systems installed. The first combat cargo vessel, built more or less piecemeal, required 180 days from keel laying to launching, as compared to 118 days for the 11th hull and scheduled time of 42 days for the 32nd hull.

With the midship section in place, adjacent sections are rapidly placed, fitted and welded together. Welding, of which there is 81½ mi. on just the hull of one combat cargo ship, is performed in accordance with a planned sequence approved by the Maritime Commission and the American Bureau of Shipping. By following such a sequence the danger of locking in stresses, of warping and distortion is greatly minimized. This is important, because with the exception of the relatively small number of rivets used in the gunwale bar—an angle bar running from about the first through the third quarter of the length of the ship and tying the main deck to the shell—the combat cargo ship is completely welded.

Manual and Machine Welding

Throughout the shipyard two types of hull welding methods are used, manual and machine, the latter being ideal for flat, straight runs. Manual welding accounts for about 80 percent of all hull steel welding and is done with electric power generated by individual motor-generator sets placed near the welder. Coated electrodes, most of which are 3/16 in. in diameter, are used throughout. Each production welder who remains in one location is assigned to one particular machine on each shift. Tackers, whose work consists of spotting a weld here and there during fitting, share a bank of machines connected in parallel, a system which more economically uses power and equipment because of the intermittent demands. Pipe connections are welded either electrically or with gas, radiography being used on the joints of high pressure lines to detect flaws.

As the hull begins to take shape, equipment is installed in a predetermined sequence. Final connections are not immediately made, the need being to get the material inside so that sections will not have to be cut out later in order to install it. Piping, ventilation and electrical work begins as soon as the hull sections are fitted and welded. In this way installation of the vast amount of equipment and connection of systems can be

(Continued on page 152)



Cleaning Up on All Fronts!

Our fighting men are doing a double "clean-up job" on all fronts. To combat dirt and disease they use modern washing machines powered by trouble-free, air-cooled Briggs & Stratton gasoline engines — one more service for hundreds of thousands of Briggs & Stratton engines, now "humming" away for Victory.

Air-Cooled Power



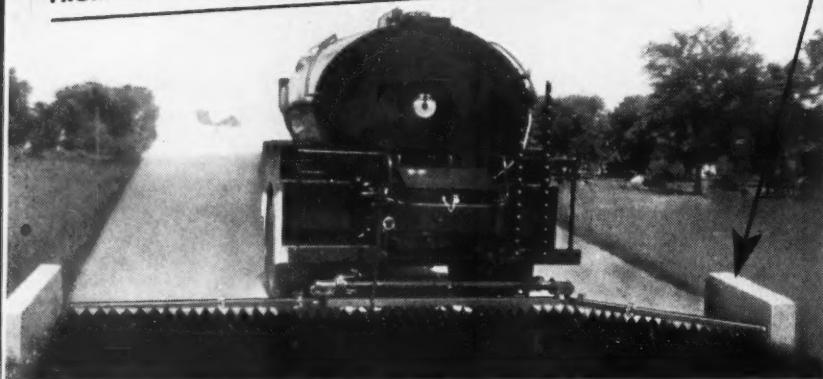
Manufacturers, distributors, dealers, and users of all types of appliances, tools, and equipment requiring dependable, compact power units vouch for the performance record of Briggs & Stratton engines. The latest models are backed by the experience gained in twenty-five years of continuous production of more than 2,000,000 Air-Cooled Gasoline Engines. BRIGGS & STRATTON CORP., Milwaukee 1, Wis., U.S.A.

ETNYRE

"Black-Topper"

BITUMINOUS DISTRIBUTORS

NO DAMAGE
FROM ROAD OBSTRUCTIONS:



Etnyre Folding-Type Turn-Up Spray Bar has everything! Ends fold up for traveling... swing back to relieve if obstruction is hit. Bar raises, lowers, shifts from side to side, shapes to conform with road crown. Sprays from either side. Inverts for cleaning. Get complete story from nearby Etnyre Dealer or write us.

E. D. ETNYRE & CO., Oregon, Illinois



Model "J"

HUNDREDS
IN USE

★
For Small Jobs
Housing
Projects, Etc.

★
FAST
LOW COST



Gives small contractor BIG operator's machine economy. Low cost—anyone can afford. Hundreds being sold to smaller contractors throughout the country. Even green operator does 1000 square feet in 15 minutes.

Write or Wire for nearest distributor.

Whiteman MANUFACTURING CO.

3249 Casitas Avenue

Los Angeles 26, California

(Continued from page 151)

as far along as possible before launching, thereby reducing the time necessary to complete the ship at the outfitting piers.

The stage of completion that a hull should reach at launching varies in accordance with a number of factors, one of the most important of which is the balance which exists between the facilities of the shipways and the outfitting piers. This shipyard has found it most practical to launch the ships at somewhere around 65 percent completion, resulting in capacity work on the six ways and four outfitting berths at all times. In this way, a triple play occurs whenever a ship is delivered: first, a ship goes to sea; second, a hull is launched to fill the vacant berth at the outfitting pier; and third, a keel is laid to fill the vacant shipway.

To the uninitiated a hull at launching looks as if she could sail away under her own power. Her hull lines are complete; her welding seemingly finished; her propellers, shafting and rudder installed; and a coat of paint applied. However, this is only a skin-deep look. Hundreds of thousands of man-hours of work, or nearly 30 percent of the total, are required to install the enormous number of small and large pieces of equipment, to make final connections and adjustments to all systems and machinery, to insulate and paint the hull, and to test the functioning of every item. The neat, compact appearance common to ships is not achieved easily, but requires good design, ingenuity, craftsmanship and time. However, with intelligent planning and the know-how obtained through repetition, the time of construction is cut on each additional ship. For example, the first hull of the combat cargo type was 180 days on ways and 100 days at the pier, and the seventh dropped to 144 days on ways and 49 days at the pier, an overall reduction of 31 percent. Even this will be bettered considerably as more ships of the same type are built.

Gruelling Tests for New Ship

In addition to undergoing complete tests at the pier, including the operation of main propulsion machinery, the completed ship is taken to sea for about 12 hr. and put to gruelling tests witnessed by members of the trial boards of both the Maritime Commission and the Navy. The traditional broom tied to the rigging, signifying a clean sweep, is the result striven for and usually obtained on the trials. Following the successful trial, an inspection of all machinery and correction of any defects is made, after which the sleek new weapon of warfare is delivered to the Maritime Commission and commissioned by the Navy.

Few products of industry can attain the majestic appearance which a newly

(Continued on page 154)

TWO GREAT NEW RUBBER-TIRED DEVELOPMENTS!



The Moto-Crane "6 x 6"—for Unlimited Mobility

Developed for war use and proved under toughest military conditions, this new, buskier Moto-Crane features 6-wheel drive, exceptional soft-ground flotation and 20-ton capacity. Its eight speeds forward and two in reverse provide the range to move from job to job at 30 M.P.H. or crawl through the heaviest going. The "MC 6x6" is ideal for pipeline and other off-the-road construction where power and traction for tough going must be combined with versatile crane and shovel operation. Send for complete data.

First to produce a truck crane 27 years ago, Thew continues its long leadership in building rubber-tired cranes and shovels with these two latest developments — the new Moto-Crane "6x6" and the Self-Propelled Crane. To you and every user, these new machines bring new mobility, broader job applications, new speed and new low job costs. Get the facts now from your nearest Lorain distributor. Plan now on cutting postwar costs, getting the job done faster with these rubber-tired Lorains!



The Self-Propelled Crane for On-the-Job Mobility

One operator, one engine both propel and operate this new machine from a single control station. Featuring 20-ton capacity; 4 speeds to 7 M.P.H.; air-power steering; full revolving turntable; and simultaneous boist, swing and travel, the Self-Propelled Crane is the perfect answer to high-speed material handling in yards, docks and on semi-stationary construction operations where on-the-spot, rubber-tired mobility is a factor. Send for complete data.

Reg. Trade Mark
thew. Lorain

CRANES • SHOVELS • DRAGLINES • MOTO-CRANES

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THEW SHOVEL CO.
LORAIN, OHIO

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BETTER PIPE TOOLS



Threads of Lathe-cut Smoothness

Machined from special oil-tempered Chrome-Vanadium Tool Steel, with hob-cut teeth "backed-off" from their ground cutting points; with accurately figured cutting angles and chaser rakes and ample chip clearance, these finer dies produce threads of lathe cut smoothness. They cut freely, faster, without drag and spin off the pipe without tearing or jamming.

Hardened, drawn, tempered and tested, they hold their keenness and free-cutting qualities.

They fit all standard made Stocks or Threaders—"Adjustable," "Receding" or "Solid"—come in all pipe sizes from $\frac{1}{4}$ " to 2".

ARMSTRONG BROS. Stock and Receding Threaders are improved in design, accurately balanced and machined inside and out.

Write for Catalog



Eastern Sales Office: 199 Lafayette St., N.Y.

(Continued from page 152)

completed ship has as she is nosed away from her berth by puffing tugs and as she moves away into the distance under her own power. The rugged character of shipbuilding—the necessity of working outdoors in all kinds of weather, the noise, the grime, the physical exertion, the drudgery of working seven days each week with no holidays to look forward to, the constant night work—is harsh treatment for the former salesmen, lawyers, teachers, housewives and others to whom shipbuilding is a new experience. Nevertheless, it all seems worthwhile when that new ship goes off to war.

No greater tribute can be paid to the American way of living than the simple statement that the merchant marine of the United States is now the greatest in the world's history.

* * *

Army Engineers

Build Pipelines, Roads and Airfields

(Continued from page 72)

Engineer equipment and supplies to keep our Army in operation. In the calendar year 1943, the Army Service Forces, through the Corps of Engineers, bought nearly \$1,500,000,000 worth of supplies. The largest single category was general engineer equipment amounting to more than \$600,000,000 and another \$400,000,-000 went for construction equipment. In addition, we spent \$200,000,000 for crawler-type tractors alone. In this current year our total engineer supplies and equipment will amount to nearly two billion dollars, and in 1945 we must again purchase \$1,700,000,000 worth of supplies through the Corps of Engineers. This is only slightly less than this year's production and considerably in excess of last year's.

A construction program of \$11,000,000,-000, the raising and training of 700,000 Engineer troops and the provision of construction equipment and supplies have been outstanding achievements. But these were only the preparatory steps in the role of Engineers in this war. The

(Continued on page 156)

Time Is Money!

SAVE IT IN

**BIG
CHUNKS**

To get the job done faster, depend on

VIBER
Concrete Vibrators

High speed—9500 RPM in concrete! Powerful, rugged, portable, interchangeable Vibers help beat schedules.

Step up profits by "Vibering" that next job. For full details send for latest catalog NOW.

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COMPANY

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BURBANK, CALIFORNIA

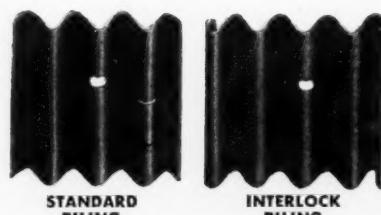
CORRUGATED STEEL SHEET PILING

Economical . . . Watertight . . . Light in Weight . . . Strong . . . Easy to Handle . . . Easy to Transport . . . High Salvage Value. Recommended for Sewers, Sewage Disposal Plants, Cofferdams, Bridges, Bulkheads and Like Purposes.

2 TYPES OF CORRUGATED MEET YOUR NEEDS

Not only is Corrugated designed especially to give strength with light weight, it is also made in two types to fit the requirements of almost every piling job.

This plus the fact that Corrugated is easy to transport, stack and install; that it saves man hours and power, can be reused time and time again, are all reasons why it is being specified on Federal, State and Municipal jobs throughout the country. Available in lengths up to 30 feet. Why not consider Corrugated on the next job you figure? Send for Catalogue today.



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When Any Project Involves Concrete

**GET THE
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ECONOMY
FORMS**

In making up your bid on any project involving concrete construction — including buildings, bridges, culverts, tanks, tunnels, sewage or water treatment plants, take advantage of the substantial savings that Economy Steel Forms and service can make in time, cost and manpower.

Economy service provides estimates, form-erection drawings, steel forms, spreader-ties and accessories, trained foremen and plate-setters for contractor to employ. The results: Superior construction, faster work, reduced cost without investment in form-material or equipment. Our engineers are at your service, without obligation.

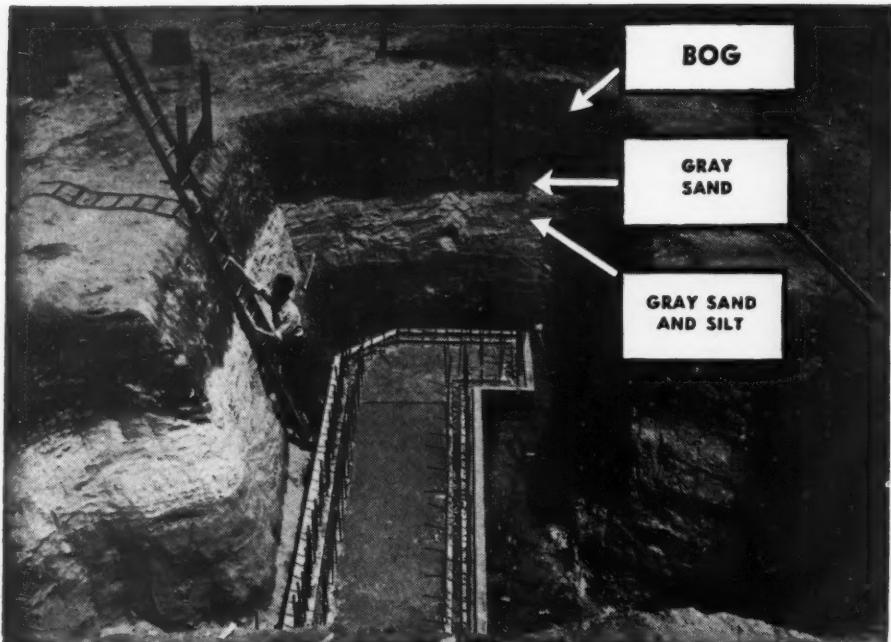


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A nation-wide form-rental and engineering service that saves critical material and time in concrete construction. We welcome job inquiries by letter, wire or telephone

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—and **GRiffin WELLPOINTS 75 FEET DISTANT!**

Yes—the Griffin Wellpoints installed around an area 75 feet away so thoroughly predrained the ground that no additional wellpoints were needed—and no shoring or sheeting either! Dense stuff, hard to predrain—yet Griffin Equipment DRIED IT! Results count—why say more?

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MAIN OFFICE: 881 EAST 141st STREET, NEW YORK 54, N.Y.
GRiffin WELLPOINT CORPORATION

(Continued from page 154)
end-result is in the active theaters of operations overseas. Let us look at what our engineers are doing around the globe.

Operations Overseas

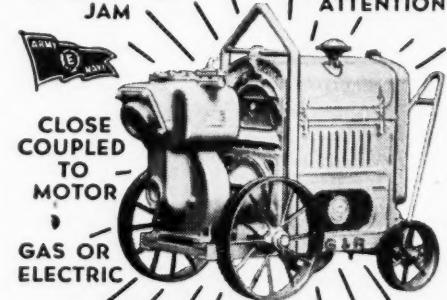
In France and Italy, we find them performing all the usual Engineer functions that go with a modern Army. Engineer troops participated in the initial landing in Normandy. Much hasty and arduous construction work was necessary to fix the beachheads so that the vast volume of supplies and equipment could be unloaded and moved forward. The construction of airfields in France began with the first few hours of the invasion. To date, more than 130 airfields have been constructed in France. Roads have been built, railroads have been repaired and operated, ports have been reconstructed and opened up to shipping. The communications network, partially destroyed by the Germans, has been restored and is in operation. Facilities for the storage and handling of supplies and equipment have been constructed.

One of the most recent operations to come to my attention is the engineering

(Continued on page 158)

**Streamlined
INSIDE for Higher
Efficiency and Lower
Operating Costs**

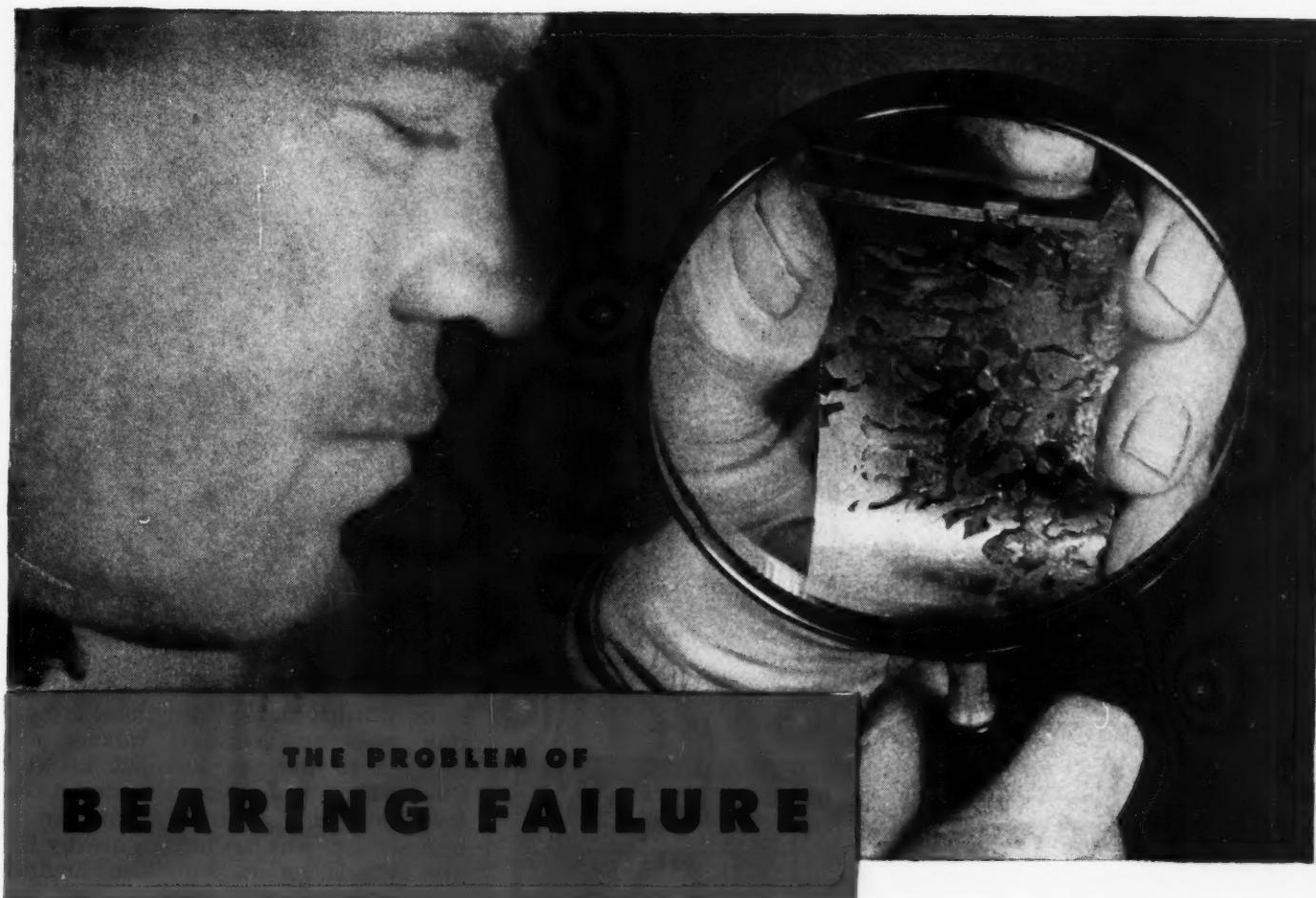
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JAM HOLDS PRIME
REQUIRES LITTLE
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RUGGED SIMPLICITY OF DESIGN
ELIMINATES RECIRCULATION—
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PER GAL. OF GAS
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GORMAN-RUPP
Self-Priming Centrifugal Pumps



THE PROBLEM OF BEARING FAILURE

SUCH THINGS as load, speed and temperature have a very material effect on the life of automotive bearings. Sometimes bearing failures are caused by dirty lubricating oil. When the oil is contaminated with water, fuel, sand, dirt, carbon particles or finely divided metal, excessive wear in the bearings results. Present day driving conditions which tend to create low temperature sludge, clog oil lines and screens and result in burned out bearings.

A great many bearings are ruined by overloading (lugging) and overspeeding the engine; by such driving habits as the prolonged use of the engine as a brake in low gear, down long grades; continuous driving at top speeds; failure to shift gears on hard pulls.

WHY BEARINGS FAIL

1. FATIGUE FAILURE: Due to several causes. Among them: overloading; overspeeding; deflections of crankshaft; insufficient oil clearance or stoppage of oil supply; distortion due to poor fit of bearing inserts; out-of-round crank pins and crankshaft journals. As a result of fatigue failure, the bearing metal cracks and flakes out, the rod portion of the bearing failing first, then the bearing cap.

2. WEAR FROM DIRT: The result of infrequent draining and flushing of the crankcase or infrequent servicing of the air and oil bath cleaners.

3. WIPPING: Friction heat often causes the bearing metal to melt and run, or to become soft and plastic. This in turn allows the bearing metal to wipe or smear against the harder metal surfaces of the crank pin or bearing journal, cracking

and wiping the bearing metal. The causes for this failure are: lack of oil; plugged oil passages; clogged pump screen; worn oil pump; leaky oil pump suction line; broken oil lines or connections; misfit bearings.

4. CORROSION: Prolonged high speed driving and overloading will produce crankcase oil and bearing temperatures above 250° F. in most late model engines. At such temperatures most lubricating oils are subject to oxidation and consequent production of organic acids that are corrosive to bearing metals. The remedy is to use lubricating oils that won't readily form corrosive acids and to drain and flush crankcases frequently.

WATCH DRIVING AND SERVICING

To avoid bearing trouble, don't overload; don't brake with the engine for prolonged periods of time; don't use all your horse-

power any more than you have to. Have your engine serviced at more frequent and regular intervals. Use only the best lubricating oil obtainable.

RING-FREE MOTOR OIL HELPS PREVENT BEARING FAILURES

Macmillan Ring-Free Motor Oil has the properties that guard against bearing failure. It has high film strength; high heat resistance; a long cling to the vital parts of your engine; fast penetration. It has a cleansing action that washes away carbon particles, carrying them into the crankcase where these impurities are drained at time of oil change.

FREE FOLDER on "Bearing Failures—Causes and Corrections"—Send today for your copy. Address Macmillan Petroleum Corporation, Room 1006, 530 West Sixth Street, Los Angeles 14, California



MACMILLAN RING-FREE MOTOR OIL

MACMILLAN PETROLEUM CORPORATION—50 WEST 50TH STREET, NEW YORK • 624 SOUTH MICHIGAN AVENUE, CHICAGO 5 • 530 WEST SIXTH STREET, LOS ANGELES 14 • COPYRIGHT 1944, MACMILLAN PETROLEUM CORPORATION



A HOIST TO
FIT THE JOB

This Signal Corps picture, taken somewhere in France, shows U. S. Army Engineers using a Coffing "Safety-Pull" hoist in the construction of a treadway bridge.

Every day brings the war nearer to a successful conclusion and Coffing Hoists are doing their part, both on the war front and the home front.

Whether in mills, factories, mines, utilities, oil fields, construction, production or maintenance there is a Coffing Hoist that will help you do the job faster, better and more economically. Write for Catalog No. DG-6.

COFFING HOIST COMPANY
RATCHET LEVER HOISTS - SPUR GEAR HOISTS - ELECTRIC HOISTS
LOAD BINDERS - DIFFERENTIAL HOISTS - TROLLEYS
DANVILLE, ILLINOIS

(Continued from page 156)

work just now being finished along the Albert Canal. When the Germans withdrew from Belgium and southern Holland, leaving the canal in our hands, they naturally wanted to make sure that we would not use that important waterway. In the hundred miles between Antwerp and Liege, they destroyed 200 bridges and dumped the wreckage into the canal. They blew up the locks and threw concrete bridge spans into the water in front of the lock gates. They sank vessels across the channels, dynamited the walls and bulkheads.

British and American Engineers divided the job of restoration. In the American sector our battalions yanked 60 bridges out of the canal in two weeks. Repair crews went to work on the locks almost as soon as the enemy had fled. Others started to construct necessary bridges to speed the flow of vital traffic to the battle zones. They worked around the clock on the new bridges and the new lock gates. Captured German derricks, piledrivers and draglines, arc cutting tools and concrete mixers were dragged to the job and put to work. Steel girders came from a captured German mill in Luxemburg, lumber for bridge floors was hewn from nearby Belgian woods by an American Engineer forestry battalion. They got the canal open and it is now being used as a supply line for the Allied armies.

Railroad Repairs

Another example will illustrate the type of work our Engineer troops are doing in France. One railroad line ran south from the Normandy peninsula into the heart of France. The Germans destroyed this line systematically as they retreated. Our own Air Forces had helped by blasting many bridges and yards. On Aug. 13, 1944, the German lines broke and fell back and our spearheads took after them. The break-through disorganized the enemy. If we could exert continuing pressure, following up our early advantage, our field commanders realized that we could exploit those early gains. But it required great quantities of munitions and supplies to continue the push. We had those on the beach and it was necessary to haul them forward somehow. The roads were few and badly battered, not equal to the task.

General Patton on the morning of Aug. 13 asked the impossible. He insisted that the railroad be rebuilt and the munitions trains start running in 48 hr. The Engineers agreed to try. They promised nothing but said they'd do their best. That was enough for Patton and he planned his movements accordingly. The job they set themselves was this: Grade and lay the ties and tracks on some 45

(Continued on page 160)

Materials
PROCESSING EQUIPMENT

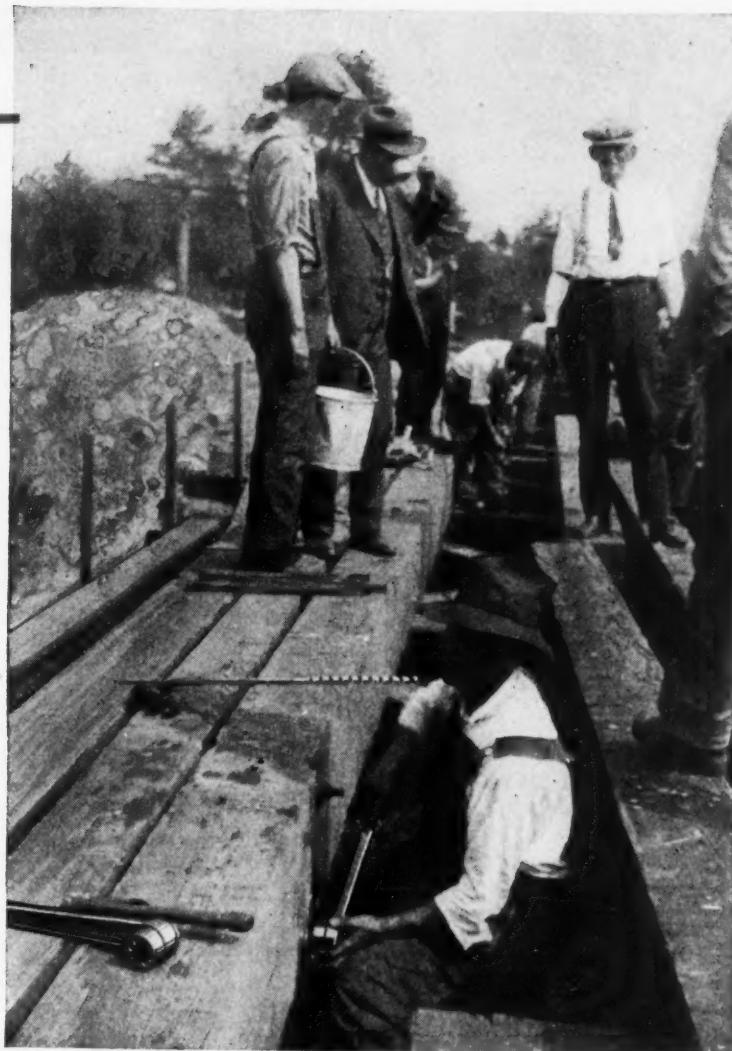
Sifters, Crushers, Cutters, Dry and Liquid Mixers,
Mills, Grinders, Pulverizers, Conveyor Systems,
Complete Installations.

The handling equipment construction "know-how" of the Mercer Engineering Works, Inc., Clifton, N. J. . . . The more than 40 years processing equipment experience of Robinson Mfg. Co., Muncy, Pa. . . . All are embodied in and represented by

MERCER-ROBINSON, CO., INC.
30 CHURCH ST., NEW YORK 7, N. Y.

Materials
HANDLING EQUIPMENT

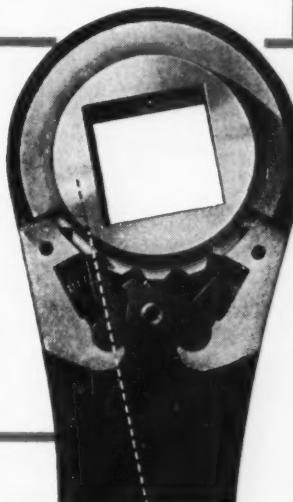
Trailer Trucks (All Types) Wheel Tractor Cranes (3 to 7 ton)
Fork Lift Trucks, Lift Platforms, Hoists, Live Skids, Wheels, Casters.



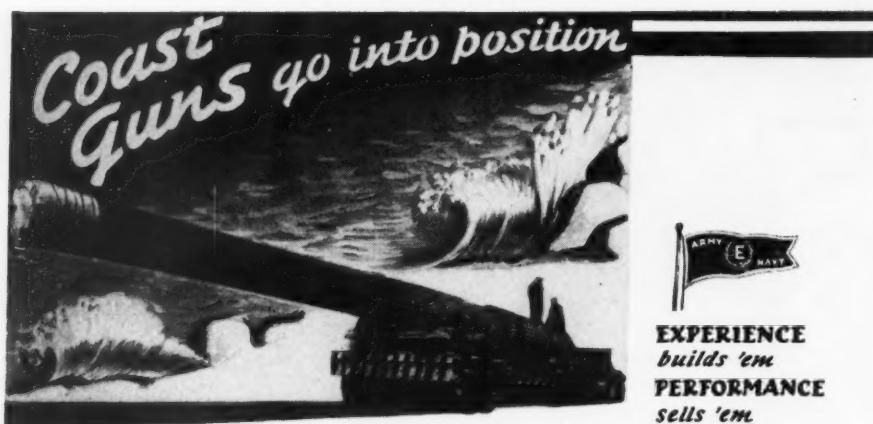
WHETHER the job involves bolting up timber stringers or banding a woodstave pipe—you are likely to find LOWELL Red Ratchet Wrenches entrusted with the work. Their safety, speed and adaptability to a wide range of construction, are recognized by contractors everywhere. Sold through leading distributors.

Straight line LEVERAGE...

See how each pawl, when engaged, transmits leverage from the solid stock of the handle, direct to the gear, in a straight line and with a square contact. The pawl is in compression only—no shear, no tension, no torsion. The shipper carries none of the load. This strong construction insures steady service.

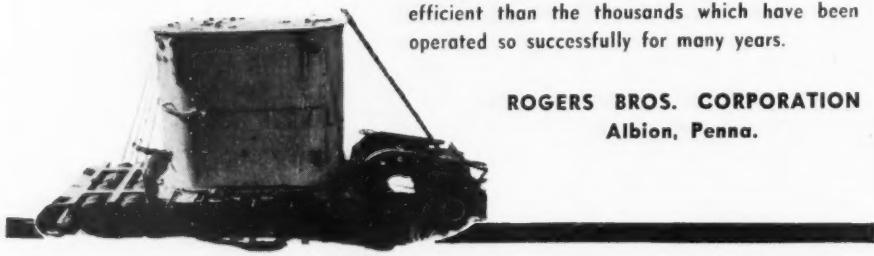


76 Years Serving the Heavy Construction Industry
LOWELL WRENCH COMPANY
1869 WORCESTER 8, MASS., U.S.A. 1945



EXPERIENCE
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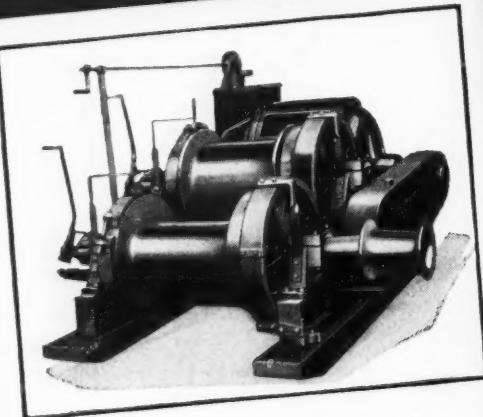
SAFE from Invasion is no idle boast today. The enemy has been driven from the Alaskan outposts and they dare not attack us here!

ROGERS TRAILERS have played a big part in fortifying our coastlines and they are fighting with our men overseas!

The ROGERS TRAILERS which will be available to industry when present war contracts are completed, will be better-engineered and more efficient than the thousands which have been operated so successfully for many years.

ROGERS BROS. CORPORATION
Albion, Penna.

Hoists to Fit the Job



Lidgerwood hoists have earned a 70-year reputation for dependability and efficiency *on the job*. There's a Lidgerwood gasoline, steam, electric or Diesel hoist to fit every construction need. When you need a hoist inquire first of LIDGERWOOD.

HOISTS FOR:
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CONTRACTORS
MINES—DOCKS
RAILWAYS

LIDGERWOOD
ESTABLISHED 1873

Manufacturing Company

MAIN OFFICE AND WORKS • ELIZABETH, NEW JERSEY

(Continued from page 158)

mi. of line so badly blasted by our guns and the enemy's and by our bombers that many miles of it amounted practically to laying a new line; build seven bridges; reconstruct three railroad yards; provide watering facilities where water towers had been destroyed.

Forty-eight hours after the order to rebuild the line had been received, the first trainload of supplies rolled across the new bridge at Ste. Hilaire de Harcourt, the last of the seven bridges to be replaced. Ahead lay a clear line all the way to the Seine.

Rehabilitation of Cherbourg

An even greater project was the rehabilitation of the port of Cherbourg. The German destruction of the facilities at Cherbourg was complete. The harbor was heavily mined, the piers, warehouses, railroads and roads were destroyed; all shipping in the harbor had been sunk; even the wrecked piers were mined. Engineer troops undertook the restoration of the port immediately following its capitulation. In three months they had more than doubled the peak peacetime capacity of the port and supplies were flowing smoothly through the port. To accomplish this they brought from America 3,000 tons of cement, from England 6,000 tons of sand. They poured a total of 12,000 tons of concrete. They used two paving mixers from Milwaukee, floating cranes from New York Harbor, some of Cap Moran's towboats from down the bay. They used 9,000,000 b. ft. of lumber and ten American piledrivers drove 10,000 piles. They took 75,000 bolts into Cherbourg, and in forge shops quickly set up on the shore pounded out 108,000 drift pins.

Supply Line in Persia

In Persia the problem was one of opening up a permanent supply line through a poorly developed country into Russia. A new modern seven-berth port was built at Khorramshahr at the head of the Persian Gulf. The Iranian State Railway which was little more than two streaks of rust was modernized and turned into an efficient 1,000-mi. fast freight system with a capacity of 130,000 tons per month. In July of this year it actually hauled 171,000 tons—25 percent more than the estimated peak capacity. Plants were constructed for the assembly of airplanes and motor vehicles. Airfields were constructed for an air route into Russia.

The road construction job in the Persian Gulf Service Command was divided into two parts. From Khorramshahr north to Andimeshk ran an ill-defined camel trail. U. S. Engineers took over

(Continued on page 162)



A train leaves New York every day for San Francisco at the same time a train leaves San Francisco for New York. These trains require seven days to cross the continent. (For instance, the train leaving Monday arrives at its destination the following Sunday evening.) If you were on the train leaving New York on Monday — how many eastbound trains would you meet by the time you pulled into San Francisco?

Many problems in the application of industrial rubber products have been solved within the broad scope of the Thermoid Line*. Thermoid representatives in all parts of the country have had long experience in specifying the most efficient Thermoid Products for all types of installations. Working hand in hand with these representatives, Thermoid's Engineering and Research Staffs guide Thermoid's extensive manufacturing facilities in the successful solution of countless industrial rubber products problems.

This combination has been consistently successful in widely diversified fields. Thermoid has produced results where results meant either an improvement in production technique or an improvement in the finished product. Why not talk over your industrial rubber products problem with the Thermoid representative?

Solution to train puzzle: 14



IT'S GOOD BUSINESS TO DO BUSINESS WITH THERMOID

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DIVISION OF THERMOID COMPANY

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A BUDA Earth Drill soon pays for itself

"Saved \$121.28 per day on pole line construction." —Midwest Utility

"\$7,859.76 saved by using earth drill on railroad bridge."

—Large Northern Railroad

"Impossible to drive piling in tough clay—solved by preboring with Buda-Hubron Earth Drill."

—Chicago Contractor

"Netted 75% on investment first year."

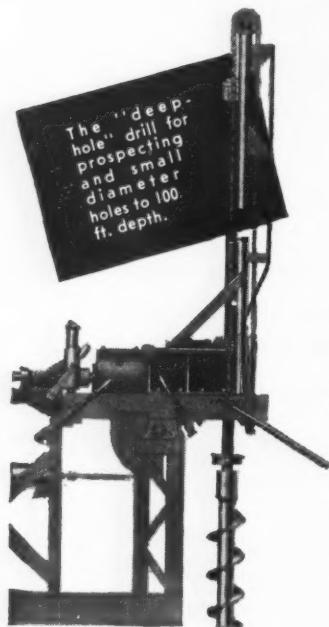
—Large Public Service

"Saved \$.79 per hole or 66% in hard pan."

—Texas Concern



Buda Earth Drill mounted on rear of truck. Also available for side mounting so driver can "spot" drill from cab.



BUDA EARTH DRILLS are available in truck, trailer or skid-mounted models to save you money and speed up hole drilling for pole line construction, foundation work, pre-boring, guard rails, piling, fencing, drainage, bridges and many other purposes. 40 times as fast as hand methods, they will dig holes through loam, clay, hard pan and shale — dig them straight and clean. Standard models for holes up to 42" diameter, 50' depth.

Write or wire for BULLETIN.

BUDA

15425 Commercial Ave.

HARVEY (Chicago Suburb) ILLINOIS

(Continued from page 160)

the construction of a hard-surface road over this stretch of desert. A new type of soil asphalt base that could be produced locally was developed. This section of the road was completed in 5 months when it had originally been estimated that it would take a year. From Andimeshk to Kazvin was 474 mi. of gravel surface with occasional stretches of asphalt which had been constructed by the British with the use of Iranian labor. U. S. Engineers reworked and improved 50 percent of this route using modern equipment and accepted Engineer practice. Despite spring rains which washed out bridges and 23 mi. of road, the entire route was ready for full traffic in June, 1943. Altogether 100 American technicians and 2,500 enlisted men and officers maintained and bettered 435 mi. of highway. They produced sufficient gravel on the scene for maintenance operations, operated snow-removal teams to keep the road open during the winter months, and constructed 15 special road camps without slowing the northward flow of aid to Russia. Along with these major items in opening up a supply line to Russia, provision had to be made for housing, storage depots, shops, hospitals and all other supplementary facilities required for its operation.

Construction in Burma

When the Japanese cut the old Burma road we took to the air to get vital supplies into China. That air route has been inadequate. With the present state of development of the airplane, we just can't expect to supply a large army by air. A road was essential and a decision was reached early in the war to build a road from Assam, the northeastern province of India, into Burma. It has been the toughest road construction job ever attempted. The route is through virgin country. It crosses broad rivers, immense tracts of jungle, and climbs some of the worst mountains in the world. Heat, disease and enemy patrols have taken a heavy toll of our workers. But the road is going through. The worst natural barriers lie behind us. Before too long we hope to break through to meet the work crews pushing down from the north along the old Burma road.

The supply of gasoline into Burma has been an extremely difficult problem. Originally fuel had to be hauled over the railroads from the ports of India to bases in Assam, and there are two different gages into Assam. From there gasoline and oil were flown over the Hump to Chinese airfields for our airplanes. The tempo of the war speeded up there on the border, and an immediate need arose for additional supplies of arms and ammunition. But the gasoline haul used

(Continued on page 164)

In Preformed, too...

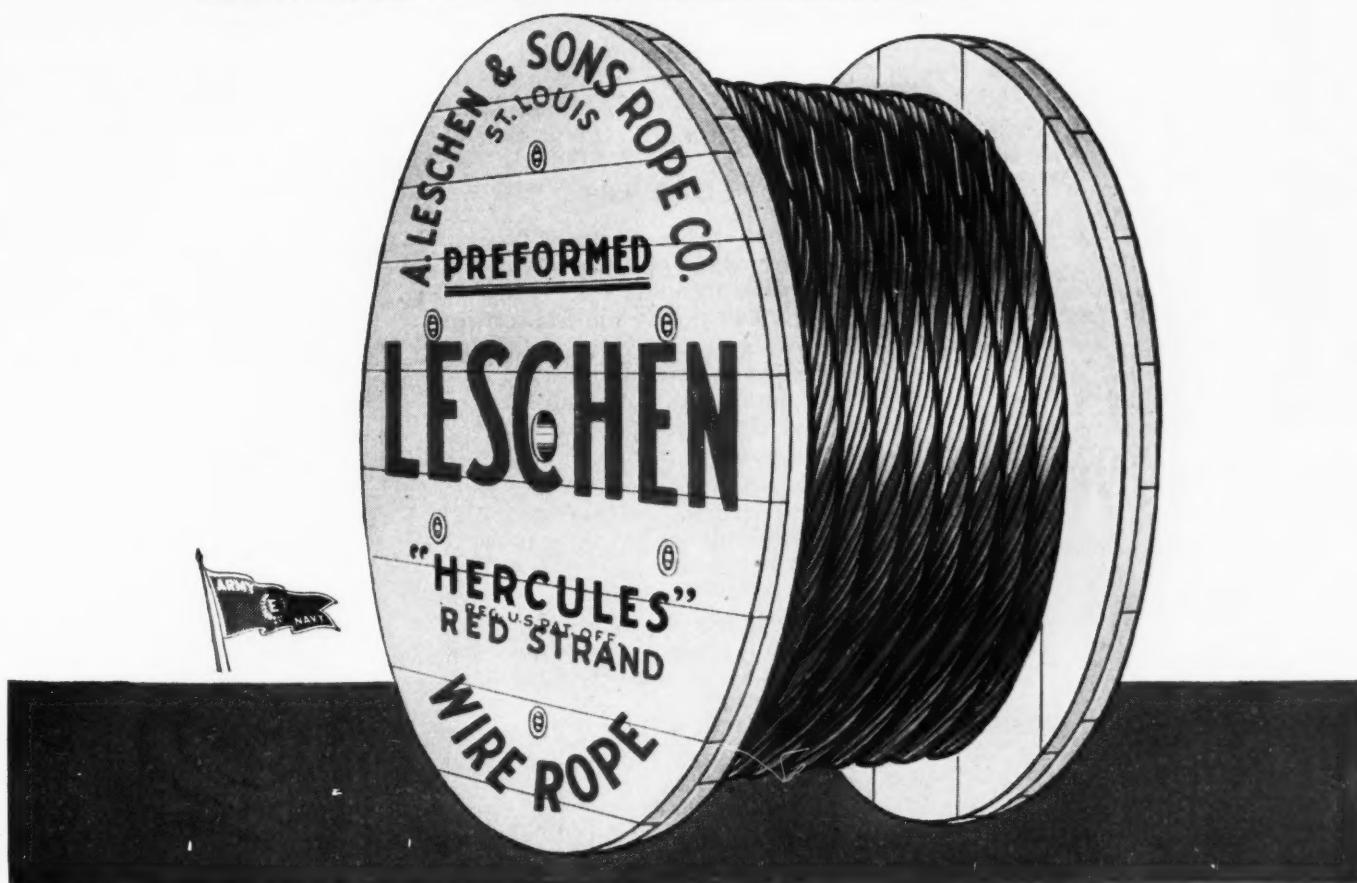
IT'S "HERCULES" Red-Strand

Strength, endurance and ability to resist wear, tear and bending stresses are the fundamental qualities of every "HERCULES" (Red-Strand) Wire Rope. It has been serving the various industries for more than half a century.

For many purposes a Preformed wire rope

Advantages of Preforming: It makes for easier, quicker and safer handling... it shortens "breaking in" time... it spools better on the drum... as the wires and strands are shaped to the normal form they will occupy in the rope, there is less turning and twisting of the rope in the grooves, and less internal movement of the wires and strands—all of which reduce both external and internal wear.

is the most efficient. If your work requires this type of rope, you will make no mistake if you let the **Red-Strand** be your buying guide. Preformed "HERCULES" is available in both Round Strand and Flattened Strand constructions. In this one grade you can obtain a correct type of rope for every heavy duty purpose.



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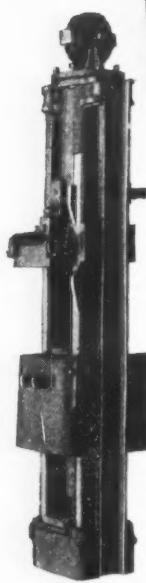
ST. LOUIS, MISSOURI, U.S.A.

SAN FRANCISCO 520 Fourth Street
PORTLAND 914 N.W. 14th Avenue
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A circular logo for "HERCULES RED STRAND WIROPE" is centered at the bottom of the advertisement. The logo features a stylized rope texture in the center, surrounded by the words "HERCULES", "RED STRAND", and "WIROPE" in a circular arrangement.

DRIVING

**WOOD-CONCRETE
AND STEEL PILES
This Low Cost
Way for . . .**



Users of WARRINGTON-VULCAN Single-Acting Steam Pile Hammers who purchased them years ago still continue to specify this thoroughly dependable, easy to operate and maintain machine. The WARRINGTON-VULCAN has a 62 year record of successful performance. It was correctly designed in the first place and does the job today. The WARRINGTON-VULCAN operates at a medium pressure and delivers a moderate frequency of low velocity blows from a relatively heavy ram. Free from mechanical troubles, you are assured of regular and continuous action.

WARRINGTON-VULCAN

Single-Acting Steam

PILE HAMMERS

Below are listed other VULCAN Products. All are extensively used. Write for complete details.

• SUPER - VULCAN Differential-Acting Closed-Type Steam Pile Hammers, 1800-3000-5000-8000-to permit underwater work.

• SUPER - VULCAN Differential-Acting Open-Type Pile Hammers, 18c-30c-50c-80c-use 25 to 35 per cent less steam per blow-give twice the number of blows per minute.

• VULCAN Pile Extractors for pulling sheet steel, wood, concrete, H-beam, and pipe piles. Sizes 200, 400, 600.

VULCAN IRON WORKS
Since 1852

331 North Bell Avenue



Chicago 12 --- Illinois

(Continued from page 162)
up thousands of cars vitally needed for this other materiel.

So the Engineer troops laid a pipeline all the way from the docks of Calcutta to advance outposts in the North Burma jungles with pumping stations where required. Part of the elevation on the pipeline is 4,000 ft. The Engineers used light invasion type pipe, 4-in. and 6-in. sizes, which can be laid quickly in flat country. The pipe is shipped with the smaller size inside the larger. A single pipeline company, given a good access road and plenty of motor trucks, can lay many miles of this line in a day. But in India and Burma the country isn't flat; there aren't enough trucks; the climate is the worst in the world; the enemy fights stubbornly to hold our crews back every mile of the way.

Part of the line is in operation, hundreds of miles of it, and planes are getting gasoline and oil deep in Burma. The trucks which formerly carried fuel now can haul munitions and other supplies. It is a great military accomplishment. The job was directed by Brigadier General T. F. Farrell, who before the war served as chief engineer for New York State. He finished the first leg of the pipeline several months ago and ahead of the estimated time of completion.

In Pacific Theater

The Engineer special brigades of General MacArthur have played a major role in the steady advance which in 15 months has covered 2,000 mi. to the Philippines. Engineer boat crews operate the landing craft which has hauled our Infantry from one island and base to another—from Nassau Bay to Leyte and now Mindoro. One Engineer special brigade in New Guinea put up its own boat assembly plant to weld landing craft together from parts shipped from the United States. It did so well that this idea has been adopted for other theaters. Engineers in Australia designed and built their own combat unloading barge, a shallow draft armored craft which looks like the Merrimac of Civil War days with the addition of a heavy lift derrick boom. It can put ashore almost anything any place any time without benefit of deep water or docks.

One of the major advantages that we have over the Japanese in the successive conquest of the islands of the Pacific is our ability to make those islands into major military bases. With our construction troops, construction equipment, and modern construction methods we can and do make an island or a key point on the coast of New Guinea capable of supporting a much superior force and a major base for future attacks.

The efforts of the Japanese to develop the islands which they have seized

(Continued on page 166)

How to get the most out of AIR COMPRESSORS

shown in this complete, practical guide to efficient and economical



Selection Installation Operation Maintenance

Here is a priceless new manual for every design, plant, or operating engineer concerned with machines and processes involving air compressors. In great detail and the clearest kind of language, and with over 400 explanatory illustrations, it tells everything you need to know, about all types of compressors, in order to choose the right kind for a specific installation and to put it in service, keep it in service, and get the most out of it.

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By EUGENE W. F. FELLER

Operating Engineer, formerly Assistant Chief Operator, Safe Harbor Water Power Corp., Associate Editor, *Power*

460 pages, 5 1/2 x 8 1/4, 414 illustrations, \$4.50

Here's a brief idea of what this helpful book gives you:

- information on the kinds of compressors available, with the pointers on performance, service limitations, etc., needed in selection
- complete mechanical description of every part of reciprocating, two impeller, sliding vane, liquid piston, centrifugal, and axial compressors
- full explanation of load-control devices, compressor lubrication requirements, and other special topics
- instructions and diagrams on location, foundation, erection, alignment, adjustment, and other details of compressor installation
- directions for operating all types of compressors, with special attention on trouble points to watch
- maintenance helps, covering everything from minor adjustments to the making and fitting of piston rings

Procedure for lining up rotating shafts — convenient separate chapter of air compressing theory —material on hydraulic air compressing — comparative costs and pointers on compressor selection—these are other helpful features of this exceptionally thorough and practical manual.

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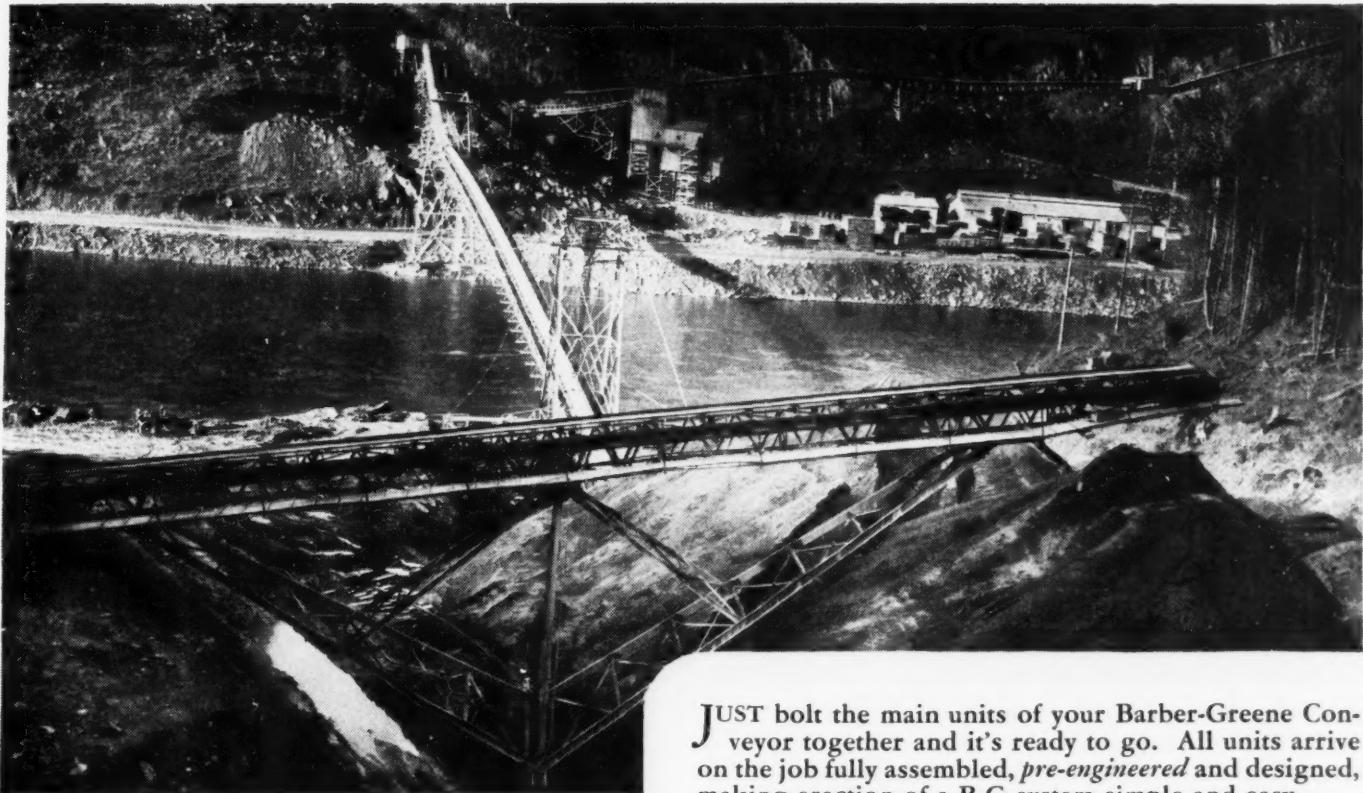
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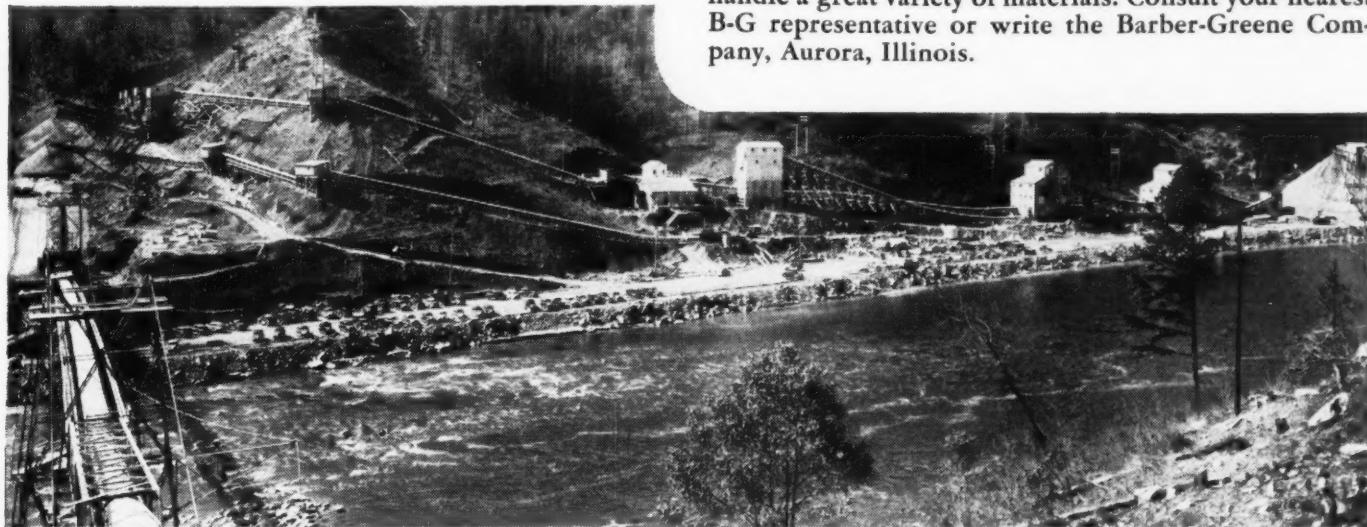
HOW CONVEYORS SAVE SET-UP TIME

JUST bolt the main units of your Barber-Greene Conveyor together and it's ready to go. All units arrive on the job fully assembled, *pre-engineered* and designed, making erection of a B-G system simple and easy.

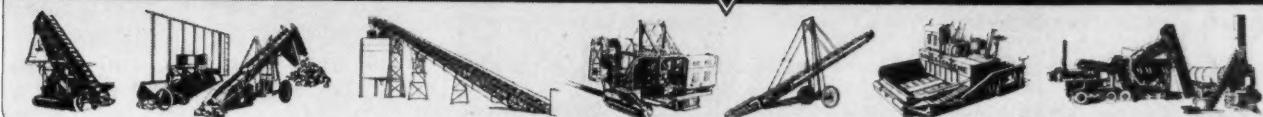
You can save many days of precious time . . . there's no delay for estimates on cost . . . standardized production avoids weeks of waiting for designing and manufacturing.

Pre-engineering and standardization enable our engineers to give you quickly a quotation on your exact needs. And, normally, conveyors can be shipped shortly after ordered—supplied from standardized units in stock.

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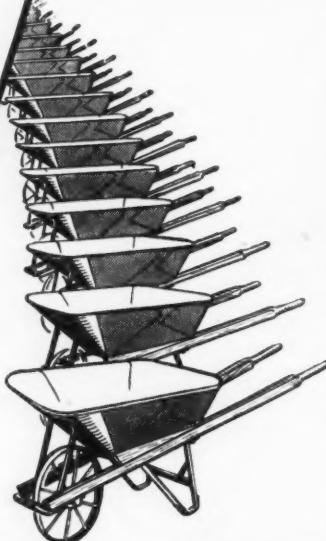


44-82

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After peace has been restored, Sterlings will again be available, in all styles and capacities, to help in the reconstruction work.



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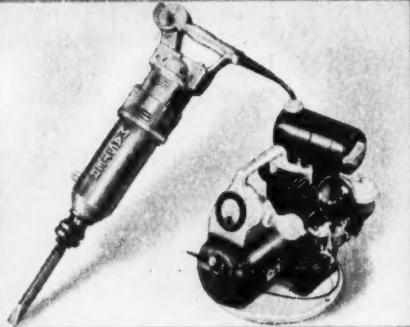
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FOR CUTTING concrete and other materials. For vibrating, tamping, chipping steel, cast iron and wood...scaling and caulking...peening welds and other heavy work.

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(Continued from page 164)

are meager in comparison with our own. I have seen many examples. About all the Japanese are able to do is to cut a few trails, build up a small air strip and make minor provision for landing supplies. In contrast, our seizure of an island is accompanied by Engineer troops and construction equipment following immediately behind the assault waves. We construct whole ports for unloading ships, roads, airfields, housing facilities and storage dumps. In a few short weeks, we convert an island into an American base. As an example, you can well visualize what has taken place on Saipan to make it into a base for the operation of our bombers. Besides the air strips themselves, we have provided docks, shops, storage depots, petroleum storage tanks, roads, hospitals, barracks and a water supply system. In the Pacific, the bulldozer has become a major weapon of war. It lands with the first troops. It hews out trails for the initial advance of our forces. It is even used to bury the pillboxes and dugouts of the Japanese. We have had to put armor plate on the bulldozers and the tractor in order to protect the operators from Japanese fire.

Similar feats are being done every month, every week, every day, all over the world wherever we find our troops. A great deal of the success of our Armed Forces can be directly attributed to the "know-how," the modern construction equipment, and the men of the engineering profession.

* * *

Highway Maintenance IN INDIANA

(Continued from page 82)

of spans involved. As a part of the contracts, the highway commission agreed to furnish the paint. The commission obtained enough paint for two contracts before linseed oil was restricted but it was necessary to cancel the nine contracts on which the paint could not be furnished. During the winter of 1943 we were able to procure paint, and in the spring of 1944, nine bridge painting contracts were awarded. Not all of these could be finished because of the man-

(Continued on page 168)

BLESSED BOLT HOLES

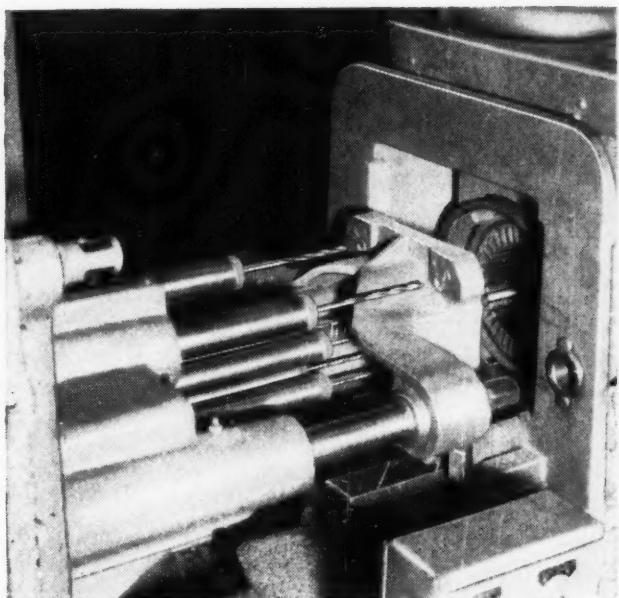
It's a blessing to electricians and maintenance men when bolt holes in motor end shields and frames are exactly in line, and mounting holes in the feet are uniformly and accurately positioned. Installation is easier. Interchanging of motors, rotating of end shields, and reversal of stators are all more quickly accomplished. Tight fits are obtained without forcing. Bearing alignment is insured, internal strains are avoided. During the war period, jig-fixture uniformity maintained in machining, drilling, and tapping Tri-Clad motor frames has saved thousands of man-hours of installation and servicing.

End shields are easily rotated for inverted motor mounting.



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Specially built production equipment, as well as test apparatus, helps build Tri-Clad motors with close fits and clearances. Here, all bolt holes in the frame are drilled in a single operation within a rigid fixture that insures accurate positioning. In the finished motor, this results in more accurate shaft alignment, smoother operation, longer bearing life. General Electric's high-volume motor production permits tooling up for high precision without increasing the cost to you. *General Electric Co., Schenectady 5, N.Y.*



Frame-drilling operation at G.E.'s Lynn (Mass.) Works.

GENERAL  **ELECTRIC**

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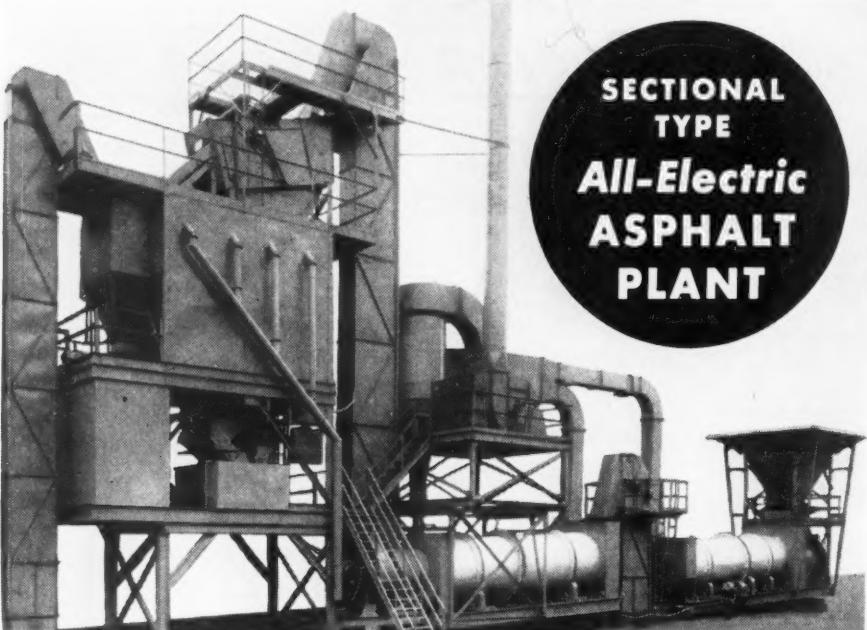
In digging and material handling, too, rapid discharge of the load is an essential feature. Every Owen Bucket is designed to incorporate rapid discharge operation — a factor responsible for their outstanding performance.

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This sectional type H & B asphalt plant is completely electrical in operation, with all units driven by individual motors—no chains or countershafts. All units are wired completely at our factory. Once the plant is assembled you are ready to hook up to the power line and start operating. The plant is quickly assembled and disassembled, and easily portable. Refinements in design include a larger fan, new horizontal cyclone dust collector and new type screen, making for greater compactness and increased efficiency. Write for complete information.



HETHERINGTON & BERNER INC.
735 Kentucky Avenue Indianapolis 7, Indiana

(Continued from page 166)

power shortage, but the incompletely work will be taken into consideration when this winter's bridge inspection is made.

A few of the special provisions included in the bridge painting contracts are:

(1) The painting of metal structures shall include the preparation of the metal surfaces, the application, protection and drying of the paint coatings, and the supplying of all equipment, tools, tackle, scaffolding, labor, and materials necessary for the entire work.

(2) The contractor shall protect pedestrian, vehicular and other traffic on or under the bridge.

(3) Paint shall be thoroughly mixed before applying and the pigments shall be kept in suspension as follows:

Pour off $\frac{1}{4}$ contents into another clean can; then with a clean paddle loosen any settled pigment. Mix thoroughly using a "figure eight" movement, gradually adding while stirring the liquid poured off. Finally box the paint several times by pouring back and forth from one can to the other.

Pour out sufficient paint for immediate use in a clean bucket of convenient size and securely replace lid on original container.

(4) Paint shall not be applied when the air temperature is below 40 deg. F. nor when the air is misty nor when, in the opinion of the engineer, conditions are otherwise unsatisfactory for the work. It shall not be applied upon damp or frosted surfaces.

(5) Material painted under cover in damp or cold weather shall remain under cover until dry or until weather conditions permit its exposure in the open. Painting shall not be done when the metal is hot enough to cause the paint to blister and produce a porous paint film.

(6) Paint shall be applied in a neat workmanlike manner which will produce a uniform even coating in close contact with the metal. Corners and crevices shall be well covered. All brushes used shall be of the "oval type" except as otherwise directed by the Engineer. The use of spray guns will be permitted, providing the resulting work will be equal to that obtained by first-class brush work.

(7) All exposed steel in both superstructure and substructure, including all floor beams, stringers, plates and castings shall be thoroughly scraped and cleaned of all dirt, rust, scale and loose paint. No paint shall be applied until the surface to be painted has been inspected and approved by the engineer. This applies to the different coats of paint to be applied as well as the surface of the steel after dirt,

(Continued on page 170)

ATLAS DURAPLASTIC

**The New Air-Entraining Portland Cement
which makes better concrete at no extra cost**



Duraplastic cement was used for the floors in the addition to Westinghouse plant at Lima, Ohio. The Green & Sawyer Co., general contractor, Lima

IN six years of use on a variety of jobs, Atlas Duraplastic air-entraining portland cement has proved itself one of the most significant advances in cement and concrete. It has been used with gratifying success since 1939 for over 2½ million sq. yds. of street, highway and airport paving and for a variety of other jobs including foundations, sidewalks, tanks, retaining walls, houses and other structures.

Experience on these jobs shows that Atlas Duraplastic cement requires less mixing water, makes concrete more plastic, more workable, more uniform and more durable, reduces segregation and bleeding, and produces concrete that is highly resistant to the action of freezing and thawing weather.

Duraplastic sells at the same price as regular cement, calls for no additional materials, spreads, screeds and finishes easily, makes

better concrete at no extra cost.

Send for free booklet on Duraplastic cement and concrete. Write to Technical Service Bureau, Universal Atlas Cement Company (United States Steel Corporation Subsidiary), Chrysler Building, New York 17, N. Y. Offices: New York, Chicago, Albany, Boston, Philadelphia, Pittsburgh, Cleveland, Minneapolis, Duluth, St. Louis, Kansas City, Des Moines, Birmingham, Waco.

CM-D-12

ATLAS DURAPLASTIC

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THE AIR-ENTRAINING PORTLAND CEMENT ORIGINATED AND DEVELOPED BY UNIVERSAL ATLAS

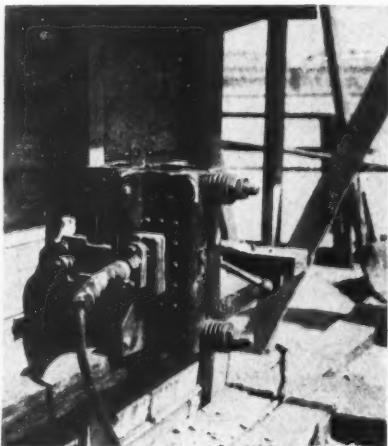
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THEIR 3600 POWERFUL BLOWS PER MINUTE make short work of—

DRILLING CONCRETE
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For vibrating wall forms, pipe forms, as vibrating screeds.

SAVE CONCRETE—SPEED UP PLACING AND SETTING

Write for catalog literature

SYNTRON CO.

500 Lexington St., Homer City, Pa.

(Continued from page 168)

rust, scale, and loose paint have first been removed.

(8) After cleaning to the satisfaction of the engineer, all exposed structural steel shall be given one coat of brown field paint throughout. In addition to the one coat of brown field paint, all steel handrails and the cover plates of the end posts at ends of the bridge shall be given two coats of white field paint. The white field paint will extend only to a height of 8 ft. above level of the bridge floor at the end posts. All other exposed structural steel not provided with the two white coats shall be given one coat of black field paint on top of the brown.

(9) In no case shall additional coat of paint be applied until the previous coat has dried throughout the full thickness of the paint film.

(10) This work shall be paid for by the contract lump sum bid.

The contractor was not limited to the amount of paint he could use but the cost of the paint issued to him was charged against the contract and deducted from the estimate. The price for the paint was set out in the proposal and the contractor took this into consideration when he bid. During the war it has been necessary to repair, extend and build structures that otherwise would have been replaced.

Policy for Mowing Roadsides

Clean, well mowed roadsides will sell a highway department to the traveling public, but a portion of this expense can be eliminated during the war. The policy adopted for mowing roadsides is as follows:

(1) Delay the mowing on shoulders and ditches until at least some of the blue grass and red top has made seed. This time will vary according to latitude.

(2) Mowing behind the ditch line should be confined to one or two trips through by hand each season, mowing only the unsightly and obnoxious weeds, plus special mowings or clean up where heavy infestations of sorrell, dock, mullein, canada thistle are prevalent. These should be timed to be most effective in weed eradication. No woody or shrubby growth behind the ditch line should be cut unless it interferes with sight distance or creates snow drift problems.

(3) Honeysuckle areas should not be machine mowed unless bar is lifted so that only the weeds and tips of vines are clipped. This will eliminate large areas previously mowed regularly. One mowing per year is sufficient.

(4) Mowing of rye and oats on new projects should be done either before

(Continued on page 172)

JOHNSON'S BULK CEMENT PLANTS
To Meet Every Need of the PAVING CONTRACTOR

CEMENT BATCHERS



Manual automatic and semi-automatic weighing types. All-welded hoppers designed to assure free flow of materials and prevent arching of cement. Discharge valve provides positive, leak-proof operation. Overhead adapter scale frame protects operating part of the scale from dirt and accident . . . contributes to convenient operation.

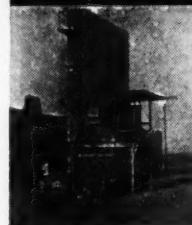
ELEVATING CHARGER

Combines advantages of adaptability, portability and Can be towed behind a batch truck. Crew of two or three men can block it into position and have it weighing 34 E



paver batches at the rate of 90 per hour in 1½ hours . . . without a crane. Quickly converted to a transfer plant or for charging truck mixers.

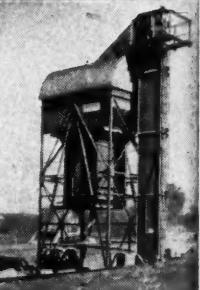
DUTCH MILL



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For contractors who need greater storage capacity than is provided by Elevating Charger or Dutch Mill. Completely portable. Capacity may be increased in the field. Equipped for unloading and batching cement delivered in any type of transportation facilities. 240 bbl., 375 bbl. and 500 bbl. capacities. Elevator Equipment with capacities up to 300 bbls. per hour.



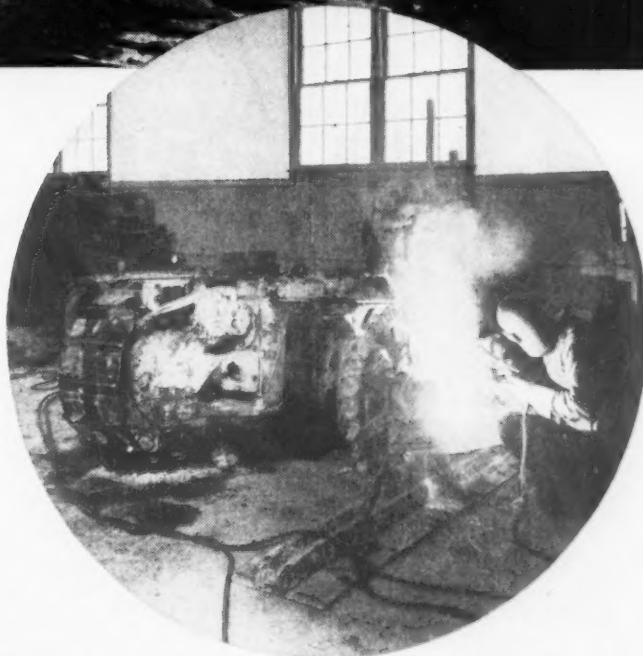
The C. S. Johnson Company
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Are you ready? Is your present equipment in condition to handle tough work? You may have to rely on it. Until war and rehabilitation needs are satisfied . . . new tractors and other road machinery will be on the "hard-to-get" list.



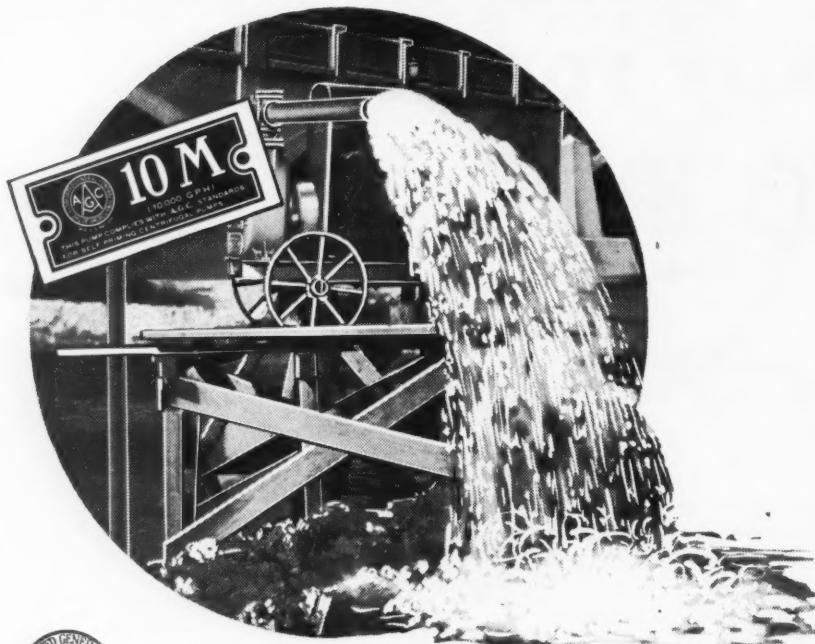
While there is time . . . put your outfit in A-1 condition. Let your Allis-Chalmers dealer lend a hand. Make full use of his skilled mechanics, modern tools and facilities. Get ready for the big program . . . NOW!

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THE GORMAN-RUPP CO.
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NOVO ENGINE CO.
Lansing, Mich.

(Continued from page 170)

the plants have "jointed," in which case there will be continued growth in the clump, or after the plants have made seed.

(5) New projects should be mowed as sparingly as appearance will allow. Continued clipping of first year grasses weakens the stand.

(6) Use the cuttings as a mulch on bare backslopes.

(7) In general, the patrolman and his regular men should do the mowing in conjunction with the power mowers which are available.

(8) The sub-district superintendent should personally check all mowing costs to see that they are kept in line with these suggestions.

We have found it to be the most economical to operate power mowers in pairs. Teams, mowers and drivers are rented from the farmer to make up for the lack of power mowers at any point in the state. The patrolman is instructed to see that no vegetation obscures the view of signs, bridge ends or any hazard that should be seen by the motorist. This is handwork that must be done.

The highway commission is charged with the maintenance of all city streets on which state routes are located. Street sweepers and flushers are rented from cities that own them, but several small sweepers have been purchased to clean other streets. Quite often several cities are grouped and one sweeper cleans all the streets. The sweepings are picked up by the patrolman who has charge of the maintenance of that section.

Snow and Ice Removal

All highway departments probably have the same snow and ice removal problems at this time. Methods of removal are approximately the same in each state. Last winter in the northern part of the state during a severe snow-storm our men worked from 16 to 20 hr per day until they were exhausted. The foremen and superintendents did everything possible to get other men to work during this emergency but without success. Fortunately the snow and ice could be removed by the employees available at that time. The war has created a serious highway snow and ice removal problem which can be corrected only by additional manpower and new equipment.

Last year severe floods menaced some of the highways. All available trucks were moved to the point of greatest need to haul sand and riprap. To meet these emergencies burlap bags for sand are stored at sub-district headquarters that might be affected. Sand pits are located and riprap is stored in convenient locations so that it will be available when needed. Manpower will be obtained by

(Continued on page 174)

MALL Tools illustrated above are Model 80 Circular Electric Saw 8" blade 2½" cutting capacity, also 12" blade and 4½" capacity. 1½ H.P. Gasoline Powered Concrete Vibrator also available with 3 H.P. round base or wheelbarrow mounting as well as 1½ H.P. Universal Electric and Pneumatic models. Pneumatic Chain Saw, also Gasoline Engine models, can be furnished in many cutting capacities.

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**PORTABLE
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GOOD WIRE ROPE, LIKE GOOD TOBACCO, SHOULD BE MELLOW

Thoroughly "Mellowed" Wire makes Upson-Walton Wire Rope give Better Service

ADD a word to your buying vocabulary and you'll add dollars to the value you get in wire rope.

To the younger generation "mellow" means "perfect, wonderful, exceptionally fine". To a metallurgist talking about wire for rope, "mellow" means all that and more—a "mellow" wire has a valuable combination of physical properties that add up to better, longer lasting wire rope.

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and (most important quality rope can have) has extraordinary *resistance to work fatigue*.

These are important qualities to you as a buyer. A generation of making wire rope for thousands of users has taught Upson-Walton how to specify and select wire and then fabricate it into rope which keeps all its finest qualities, all these important properties.

All wire rope may look alike when new; rope made from mellow wire keeps on "looking new" and serving the user long after other rope is worn out and gone. It pays in dollars and in longer trouble-free service to specify *Upson-Walton*.



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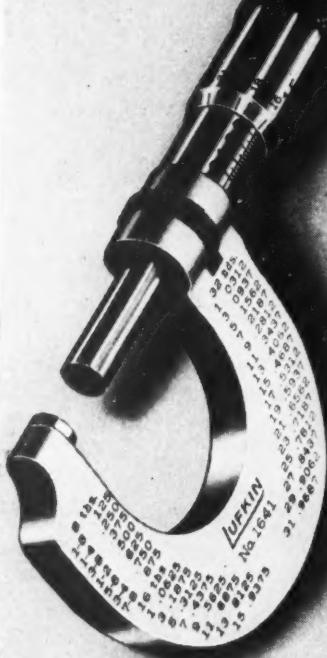
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SAGINAW, MICHIGAN • New York City
TAPES . RULES . PRECISION TOOLS

(Continued from page 172)
moving all available men to the point of greatest need.

Our metal road signs were in good condition when their manufacture was curtailed and each sub-district headquarters had an ample stock on hand. The sign men have refinished old signs and constructed special signs wherever they were needed. The patrolman has removed bad signs and brought them to the sub-district headquarters when a regular trip was necessary. The old signs were exchanged for ones which were new or refinished. The patrolman and his crew can paint the sign posts and attach the sign. This eliminates extra driving by the sign crew located at the sub-district headquarters.

The highway commission has many roadside parks with an area of 3 acres or less. Although traffic is less than in ordinary times, the patrolmen are required to keep these parks in good condition at all times.

Centerline Marking

Good centerlines on road surfaces are always essential. Liquid asphalt RC3 is used on all white or light colored surfaces and the same material covered with small lime stone chips is used on black or dark colored surfaces.

A narrow, long-base self-propelled centerliner is used to apply the centerline stripes. Black asphalt stripes are applied during cold weather because the asphalt congeals rapidly and does not track. Stone covered lines are applied during the spring or fall when the weather is warmer.

The method of applying a center stripe is as follows: The asphalt is sprayed on the road surface by the centerline. No further operation is necessary if the line is to remain black. If a white line is needed, the asphalt is immediately covered with stone chips and rolled with a water weight roller. Traffic whips off the excess chips.

The highway commission is required to mark all points on its highways that do not have a clear sight distance of 750 ft. Yellow Prismo barrier lines are applied by the same centerliner that applies the cut-back center stripe. Another self-propelled marking machine in the experimental stage but not in production, has also been used. This machine is easily transported and has many good features.

Most highway departments are faced with the same wartime maintenance problems. Most urgent are insufficient manpower and worn-out equipment. Although there has been a shortage of manpower and good equipment, the situation has been accepted as one that could not be corrected and the highway departments have made every effort to keep essential traffic moving at all times.

Pier Forming is a matter of minutes



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Sonotube

The laminated fibre tubing for forming concrete columns or pier forms.

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	8"	9"	10"	11 1/4"	12"	13 1/4"
SQUARE INCHES						
50.26	64	78.54	100	113.1	144	

Smaller sizes available.

Cut to desired lengths on job with hand saw.

(For one time use)

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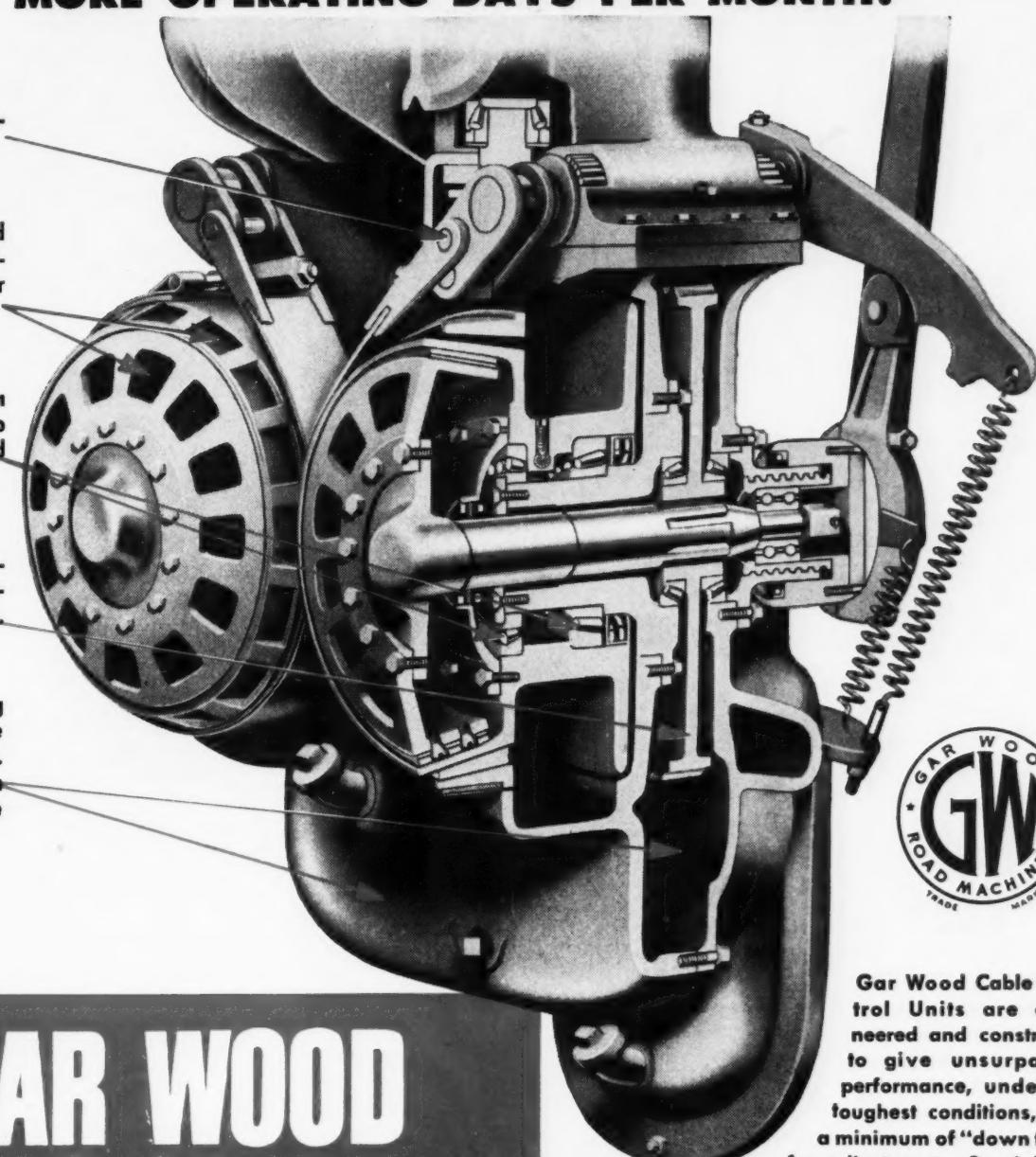
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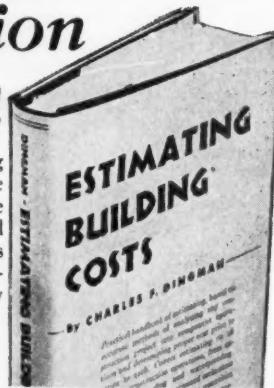
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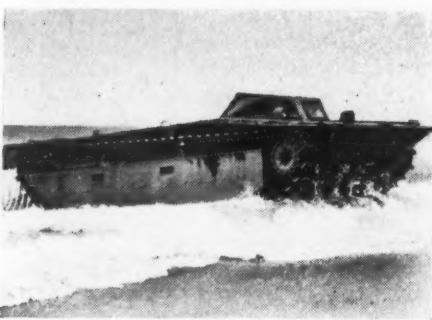
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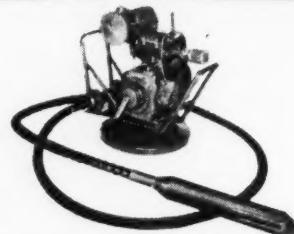
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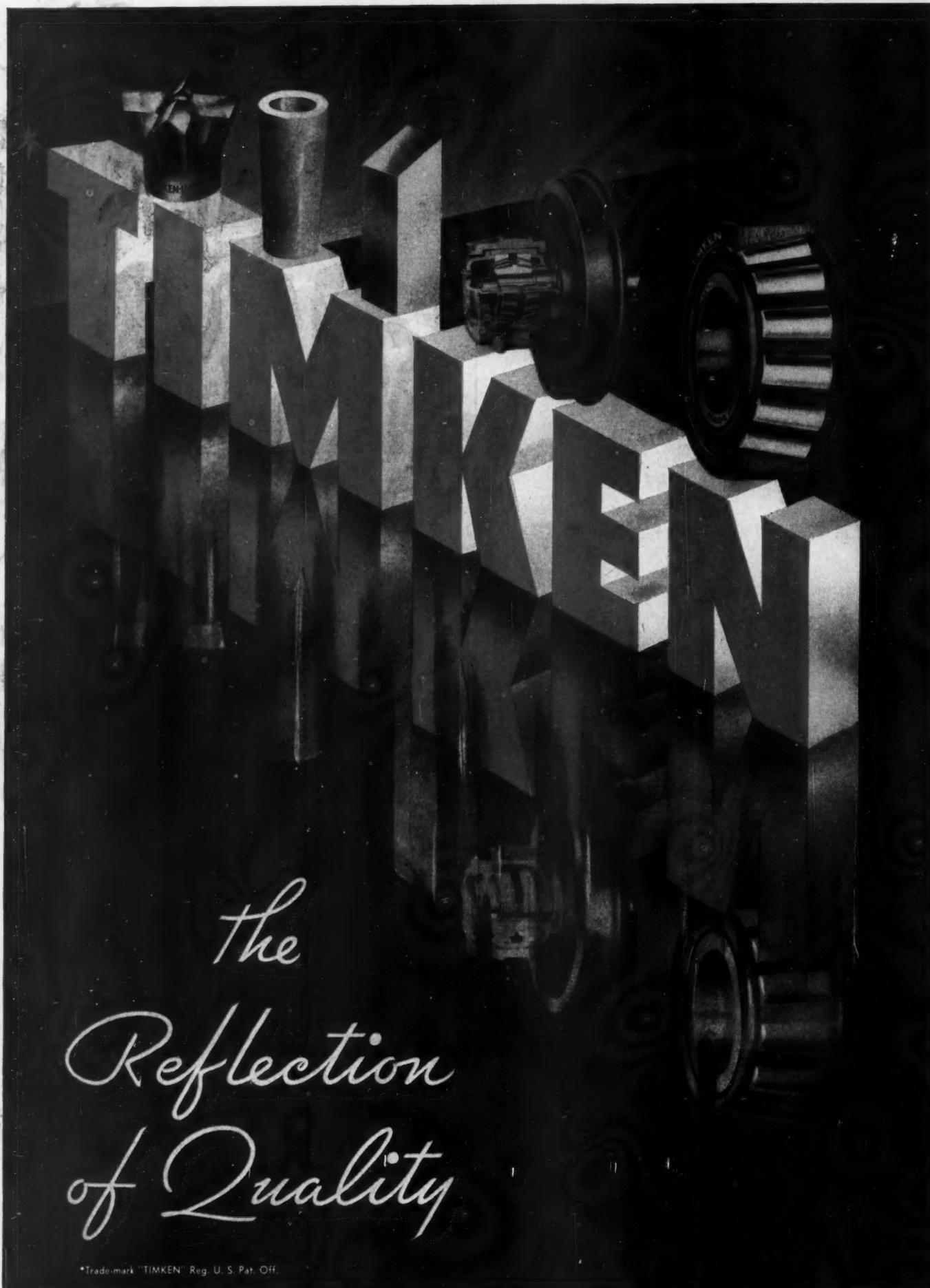
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